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THE TREATMENT OF THE COMMON COLD IN INFANTS AND CHILDREN*

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WHEN "the common cold" is mentioned before a group of physicians a clinical picture which is more or less similar is brought to the minds of the various listeners. That they will all entertain the same conception is, however, very unlikely. Certain physicians will visualize a process which involves only the nose: others, acute catarrh of the nasal and pharyngeal tissues. Still others will think of an inflammation of most of the upper part of the respiratory tract, including the nose, the accessory nasal sinuses, the pharynx, the larynx, the trachea, and the bronchi. In keeping with the effort which has been made in recent years to discard the term "cold," and to convey the meaning usually intended, the use of the term "infection of the upper part of the respiratory tract" is favored. It, therefore, seems wise to have the understanding that in infants and children, and perhaps in adults too, a cold may involve any or all of the component parts of the upper portion of the respiratory tract.

In consideration of the treatment of any disease the question of cause immediately arises. Logical therapeutic approach should consist of efforts to prevent entrance of the causative agent into the tissues of the organism, to increase the resistance of the organism to the attack of such agent or to destroy the agent if it has already invaded the tissues. At the present time, in spite of tremendous amounts of study and investigation, information regarding the agent or agents responsible for the common cold is relatively meager.

The belief that the common cold is due to bacteria such as the streptococcus, the pneumococcus, the bacillus of influenza, and the Micrococcus catarrhalis has changed to a belief that the etiologic agent is not a bacterium but a filtrable virus which may pass from one individual to another.[2] According to the newer ideas regarding the relation of bacteria to the common cold, however, the bacteria are not to be eliminated from the picture, but are to be regarded as secondary invaders and perhaps as playing the major etiologic rôle in the numerous complications of the common cold, which is produced by a virus.

Steps which may be taken to prevent the offending agent from reaching the organism are especially important in connection with young patients. It is generally agreed that infections of the upper part of the respiratory tract are serious in young individuals, and that the younger the child, the more frequent and dangerous are the complications. Although warnings have been issued regarding the contagiousness of colds, most lay people and indeed some physicians continue to disregard the rules of isolation which should be enforced in caring for any patient with a cold.

If thought is given to the meticulous care observed in isolating prematurely born infants from possible sources of infection and particularly from possible sources of infection of the upper part of the respiratory tract, the importance of isolation becomes evident. It is only too well appreciated that if a premature infant acquires a cold from exposure to an infected attendant, relative or family friend, the

*From the Section of Pediatrics, The Mayo Clinic, Rochester, Minnesota. Read before the annual meeting of the Minnesota State Medical Association, Duluth, Minnesota, July 1, 1938.

probabilities are very great that bronchopneumonia will follow and that the infant will die. If the patient is a mature infant or a young child, the chances that serious complications will develop are less but still are present.

The intimacy of contact accounts for the spread of a cold from one member of a family to the others. The difficulty of enforcing isolation under the conditions that exist in most homes frequently discourages the physician as well as the family from efforts to isolate the affected individual or individuals. Nevertheless, the necessity and importance of protecting young children, and particularly infants, remains as a responsibility of both physician and parents.

Obviously, the child who has an acute cold does not belong in school. For the sake of proper care of the affected child as well as for the protection of the well pupils, the place for such a child is at home in bed, removed from other members of the family. In spite of this, teachers and school nurses encounter not only lack of coöoperation but even active opposition on the part of the parents of many children whom they properly exclude from school during the acute stage of colds. One of the duties of the physician is to instruct his clientele in the necessity of caring for these children in the way best suited to their prompt recovery and to the safety of other members of the family and community.

Opinion is divided in respect to the use of vaccines for the prevention of colds. Some feel that vaccines definitely reduce the frequency of colds. Others believe that although the incidence of colds may not be reduced, the duration of colds is decreased. It is the opinion of others that the chief benefit to be derived from the use of vaccines is in the decreased incidence of complications. There are those, too, who have not been convinced that cold vaccines are of any value.

If it is true that colds are due to filtrable viruses (and there is considerable evidence to support such a view), it does not appear logical that they can be prevented by vaccines made from streptococci, pneumococci or the bacillus of influenza. It is conceivable, however, that such vaccines may protect individuals against the attack of these bacteria if they are secondary invaders or if they augment the filtrable virus in its invasive effects.

It is rather well accepted that the bacterial flora of the nose and throat vary in different epidemics of colds and that autogenous vaccines, therefore, are preferable to stock mixed vaccines which may contain none of the prevalent organisms or may contain so few that they can have no antigenic effect. Since the subject is controversial and since protection afforded by vaccines is far from 100 per cent, their use should be advised only with reservations. It should be definitely understood that protection is not certain.[6] The same statement applies to the use of filtrable viruses for protection.[5] A report dated January, 1938, from the Committee on Immunization Procedures of the American Academy of Pediatrics is of especial importance in this connection. In the report it was stated that there is no method for producing passive immunity for the common cold and that no active immune principle of any proved value has been described.[4]

A good deal has been said and written regarding the rôle of vitamins in the prevention of colds. Of the numerous vitamins known to exist, vitamin A has received the greatest amount of attention in respect to prophylaxis of colds. Unfortunately, some facts which are highly essential to an evaluation of vitamin A are not known. Knowledge of the optimal amount of the vitamin necessary to the well-being of the individual and the criteria for determining insufficiency of vitamin A in the body have not been definitely established. The fact that vitamin A is found so abundantly in so many foods makes it appear unlikely that any considerable proportion of the population suffers from vitamin A want. In infants and young children, whose diets may be restricted, such a want may conceivably be present. On the other hand, the widespread use of cod liver oil, which is a rich source of vitamin A (1 teaspoonful contains 2,500 units, the adequate dose is about 5,000 units) insures a generous intake for many infants. Nevertheless, even infants who receive this presumably adequate amount continue to have colds.

The active treatment of the acute cold consists of measures directed toward symptomatic relief. Of these, the one single measure regarding which there is entire agreement is rest in bed. This is not difficult to enforce in the case of infants, but if the patient is a child of

the runabout age or of school age, it is frequently very difficult to keep him in bed. This treatment should be continued during the acute stage of the infection, particularly if there is fever.

A great variety of sedatives have been used for their general effect as well as for their specific effect on the cough. Among those which have a general effect codeine has been employed a great deal. In addition to the general quieting effect, it tends to control any bothersome cough. The combination of codeine and papaverine may be administered to older children. The barbiturates are probably second only to codeine in extent of use in acute colds. If the patient is an infant ⅛ to ¼ grain (0.008 to 0.016 gm.) of phenobarbital may be sufficient to control restlessness, but larger doses may be employed. When pain is present as it is in cases of otitis media, codeine, sodium amytal, or nembutal usually afford relief and promote rest.

Antipyretic measures are indicated in some cases. If restlessness, sleeplessness and fever are present, a warm bath, preferably a tub bath, will lower the temperature a degree or two, which is usually sufficient to induce sleep. The antipyretic effect of the bath may be supplemented by drugs. For this purpose the salicylates, particularly acetylsalicylic acid, have been most widely employed.

Adequate humidity of the air in the patient's room is desirable and for that reason some means of introducing additional moisture may be necessary in homes which are not equipped with humidifiers. A steam kettle is perhaps the simplest means at hand for this purpose. Some comment may be made upon the use of steam kettles. No good purpose is served by the introduction of such excessive amounts of steam into the room that window panes run with water and condensation takes place on everything in the room, including the bedclothes and the patient's clothes. No special benefit has been demonstrated as a result of confining an infant or child in a tent into which pours a steady cloud of steam. Most of the steam kettles in use today are heated by unprotected electric elements and are therefore sources of danger from fire. Not only this danger attends the use of the steam kettle, but there must be kept in mind the possibility of the kettle being upset by another member of the family, or indeed by the patient himself, and thus causing burns.

The use of medicines such as eucalyptus or compound tincture of benzoin in the steam kettle does not add to the benefits derived from the use of the steam.

The diet need not be changed from that ordinarily taken. In infants a reduction in the amount of food, and replacement of the withheld food by water may be indicated during the first twenty-four to forty-eight hours. Such a step may prevent a gastric upset but the restriction usually need not be continued beyond the second or third day of the cold.

One of the most widespread practices in the treatment of colds must be mentioned chiefly for the purpose of condemning it. This is the indiscriminate instillation of "drops" and the spraying of various agents into the noses of infants and children. It has not been demonstrated that nasal drops or nasal sprays have any beneficial effects so far as the infection is concerned. The argument that they are used to relieve congestion and obstruction becomes very much weakened if consideration is given to the facts that they are not required for this purpose in most instances, that their effect is transitory and frequently followed by increased swelling and turgescence of the nasal mucous membrane and that they are liable to be toxic to the mucous membrane. In infants particularly, they have been held responsible in some cases for the initiation of otitis media by the washing of infected material into the eustachian tubes. Perhaps one justifiable use is in cases in which infants experience difficulty in nursing or taking the bottle because of nasal obstruction. In such cases not more than a drop of dilute 1:3,000 solution of epinephrine or a drop of 1 per cent solution of ephedrine may be placed in the nose before feedings.[1]

The practice of dropping oils of various kinds into the nose will probably lose considerable of its popularity as it becomes generally recognized that the oil may find its way to the lungs and there set up an inflammatory reaction, the so-called lipoid or oil pneumonia.[3]

Summary

The term "common cold" includes acute inflammations of any or all portions of the upper part of the respiratory tract. Treatment of the

common cold may be preventive or symptomatic. The cause of the common cold may be a filtrable virus; bacteria may be coincident or secondary invaders. Isolation of infants and young children from infected individuals is of great importance. Vaccines may be given for protection with the understanding that, although they are not harmful, they may not be of benefit. Proof of the presence in food or vitamin preparations of any substance which specifically protects against colds is lacking.

Rest in bed, sedatives, humidity, baths, antipyretics and occasionally the use of epinephrine or ephedrine as nasal drops or a spray are the chief measures which may be used in symptomatic treatment.

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Discussion

DR. ANDREW SINAMARK, Hibbing: This paper is an excellent exposition of the present day trends on the subject of the common cold. I agree with Dr. Kennedy's opinion that these cases are often over-treated. I believe that this is especially true as far as aqueous solutions in the nose are concerned. Nasal mucous membranes often show the effect of over-treatment with douches and sprays. An aqueous solution in an ordinary atomizer can set up small hemorrhages of the membrane.

In spite of the recent tendency to do away with oils in the nose, I still believe that oils are valuable. In spite of the fact that they have been shown to be dangerous in the case of infants, I do not feel that this is true in older children. The instillation of a nasal oil containing no more than 1 per cent menthol, an equal amount of camphor and the addition of other aromatics to make the mixture more agreeable, certainly gives the patient the sensation of better ventilation of the nasal passages. Furthermore, I believe that it actually does cause a little shrinkage. If the mixture contains a small amount of iodine (about 0.1 per cent) it causes a mild hypersecretion of the membranes which results in a depletion, which I believe is of more prolonged effect than instillation of epinephrine or ephedrine. Furthermore, there is no danger of oils initiating otitis media by washing infected material into the eustachian tubes.

EXPOSURE OF THE BODY TO UNEQUAL TEMPERATURE

A Factor in Pneumonia

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Eveleth, Minnesota

IN the early years of my professional life at Ely, Minnesota, I came in contact with a great many typhoid fever patients, cared for in ordinary dwelling houses, boarding houses, and shacks, heated by stoves.

It was noticed during the late fall and early winter that those patients with typhoid fever, having complications, as bronchitis or pneumonia, were occupying beds close to a window, which was the usual situation in the crowded boarding houses, the side of the bed being close to the window and the top of the bed being on a level with the bottom of the window. The heating stoves were in the room or in an adjoining hall, near the door of the room. The windows were usually closed and protected by storm windows, but the radiation from the glass produced a temperature lower on that side of the body next to it than on the side of the body toward the warm room.

The frequency with which pneumonia occurred in typhoid fever patients when thus exposed was so apparent that I had no difficulty in teaching my people its dangers, and obtaining the cooperation of the patient and his family and friends to correct the situation, which resulted in a noticeable reduction in lung complications in this disease (typhoid fever). And consequently the first question asked by the patient when I called to see him thereafter would be, "Doctor, is my bed in the right place?"

Carrying the observations further, after moving to Eveleth, it was noticed that many babies having pneumonia were those occupying a crib or baby carriage near a heating stove. On one side of the patient would be the stove and on the other a large window, or an open archway into an unheated parlor or a cold bedroom, thus exposing the patient to unequal temperature.

In a number of instances I correctly predicted

that children and babies so exposed would have pneumonia. In one instance a newborn baby was left in its receptacle between a heating stove and an open archway into an unheated parlor. The parents were warned of the danger, but did not heed it. The baby died of pneumonia during the winter. When they later built another house, they sought my advice as to the proper placing of the windows and doors so that they would have ample space for the beds.

In another instance, a family having two children, aged five and eight years, moved into an apartment house. While attending the sick mother of the children, I noticed the bed for the children was next to a window, the bottom of the window being on a level with the top of the bed. The window was protected with a storm window but covered with frost. The room contained a small heating stove opposite the children's bed. The parents were informed in no uncertain terms of the danger and told positively that the children would have pneumonia if this condition were allowed to continue. The advice was not heeded and in six weeks both children had pneumonia. One died.

So emphatically was it impressed upon me that unequal temperature is an etiological factor in pneumonia that, when building my own small hospital years ago, I had the windows and doors to the rooms and wards placed opposite each other, leaving ample wall space for beds without exposing the patients to unequal temperature. Pneumonia has never developed in typhoid fever patients entering the hospital early and free from lung complications.

At one time during an epidemic of typhoid fever, the hospital ward was overcrowded and a patient, occupying a bed next to a wall twenty-two feet from a double window, was observed to be coughing. While examining the patient, I distinctly felt a draft of air on the back of my head and neck as I leaned over the patient to examine the side of his chest which was next to the wall. There was a stiff breeze coming through the top of the windows twenty-two feet away and was directed toward the ceiling by a contrivance at the top. The wind followed the ceiling and continued down the wall where the patient was. His position was, of course, immediately changed and he promptly recovered.

I have a patient who, if he leaves a warm room and walks outside while a cool breeze is blowing, will sneeze, and his nose will begin to discharge. But if he will turn around so that all parts of his chest are cooled equally, this condition soon stops.

I have observed frequently, and many practicing in the country have undoubtedly noticed the same thing, that while making what I considered to be the last call on a patient with tonsillitis, I would find the patient downstairs on a lounge next to the outside wall or window, not far from the heating stove. To the question, "How are you feeling?" the reply was, "I was feeling much better and thought I would come downstairs, but (making an effort to swallow) I don't feel as good as I did." This is another example of exposure to unequal temperature at an inopportune time, when the patient was not in a condition to stand it. Some people are more susceptible to this unequal temperature than others.

Dr. Preble says that in certain dwelling houses there seems to be a predisposition to pneumonia. It would be interesting to know the relationship of the beds to the windows and heating unit.

It is in those cases of pneumonia in children, where the parents can not or will not protect the patient from unequal temperature, that I found the pneumonia jacket, frequently changed, most useful, chiefly, I believe, on account of its maintaining equal temperature.

It will be noticed that those advocating cold fresh air for children with pneumonia, have placed them in cold rooms. Here the patient gets the benefit of the fresh air without exposure to unequal temperature.

In conclusion, I regard exposure of the body to unequal temperature to be a predisposing etiological factor in pneumonia, as well as the cause of so-called "colds in the head," coryza, tonsillitis, pharyngitis, et cetera.

AUTOGENOUS STREPTOCOCCUS VACCINES IN THE TREATMENT OF ALLERGIC CONDITIONS, WITH SPECIAL REFERENCE TO THEIR USE IN BRONCHIAL ASTHMA*

Report of Cases

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BEFORE entering into the discussion of the subject chosen for this presentation, it would probably be well to survey briefly the field of allergy as a whole. This is done in order that the phase of the subject under consideration may be viewed in its proper perspective.

One is impressed, first of all, with the fact that the great majority of allergic cases present a family history of some form of allergy. This is becoming more and more apparent as the field has come to embrace conditions previously not considered in this light. To the old triad of asthma, hay fever, and eczema, must now be added the other forms of allergic rhinitis, sinusitis, and conjunctivitis, nasal polyps, many of the recurring wet colds, some cases of recurrent bronchitis, many cases of migraine, a large number of the vague gastrointestinal dyspepsias, possibly peptic ulcer, urticaria and the angioneurotic edemas, the spasmophilic conditions of childhood and, lastly, but assuming more and more of a prominent position, some of the chronic infectious diseases, chiefly tuberculosis and the rheumatic group. Probably other conditions should be included.

One is impressed also with the frequent association of these conditions with certain disorders of metabolism, endocrine disturbances, mineral imbalances, particularly of the calcium-phosphorus group, and with the fact that these conditions are frequently precipitated or aggravated by emotional upsets and by dietary indiscretions and deficiencies.

We are confronted, therefore, with a group of conditions which have as their point of origin a fundamentally deranged constitutional background. The distressing thing is that, in spite of the large amount of work which has been done in the field of immunity and in tissue reactions to foreign substances, very little is known regarding the real biological and physico-chemical factors involved. The present-day methods of diagnosing and treating these conditions by means of skin testing, leukopenic indices, elimination diets and the injection of various specific or non-specific proteins are all aimed at merely certain symptoms or manifestations of the fundamental constitutional disorder. In the present state of our knowledge, rather than to limit ourselves to these few procedures, it is more important that we approach these cases from every possible angle. The family history, including the health of the children, if any, must be carefully scrutinized for the particular type of background involved. The personal history should be thoroughly investigated not only for previous histories of the more obvious types of allergic manifestations but more particularly for evidence of susceptibility to acute and chronic infections, dietary idiosyncrasies and emotional conflicts. To the general physical examination and the usual blood and urine studies must be added complete examination of the stools, investigation into possible metabolic disorders, mineral imbalances especially of the calcium-phosphorus group, and endocrine disorders, as well as a complete study of the skin reactions to the various allergens.

Therapy should then be instituted for each and all of the abnormalities discovered. A word of warning should be inserted here. The error of removing too many articles of food from the diet is made more frequently than removing too few. The use of too severe elimination diets frequently leads to dietary deficiencies which in the end aggravate rather than ameliorate the patient's symptoms. It should constantly be kept in mind that all the essential food elements must be included in the diet even though it be necessary at times to do this at the expense of retaining foods to which the patient is sensitive.

*Read in part before the Minnesota Society of Internal Medicine at its meeting held in October, 1937, Saint Paul, Minnesota.

We come then to our discussion of the use of vaccines. It is hoped that the introductory remarks have indicated that the use made of vaccines in allergy by the writer forms but one small link in the treatment of this large group of disorders. It is admitted from the outset that this study is purely a clinical one and that the series presented is too small to provide the basis for any definite conclusions. If this study will, in some small measure, add to the mass of evidence presented by others or possibly provide a new point of view for further study in certain directions, its aim will have been accomplished.

The first report of the use of vaccines in asthma which could be found in reviewing the literature, was that by Carmalt-Jones[3] in 1909. He isolated a Gram-negative bacillus from the sputum of an asthmatic, made up a vaccine and administered it subcutaneously, starting with a dose of twenty-five million organisms. A marked improvement resulted in this case. He then used the same vaccine in seventy other cases, fifty-two of which he reports. Good results were obtained in thirty-nine. The same year G. W. Davis[5] reported marked relief in a case of acute, generalized eczema following the use of a staphylococcus vaccine. In 1911 John T. Farrell[6] reported the use of autogenous vaccines in three cases of chronic, long-standing, severe, generalized eczemas, with recovery in each case. In the first case a staphylococcus albus was recovered from weeping portions of the skin; in the second a mixed culture, chiefly a large diplococcus, from a skin papule; and in the third, a colon bacillus from a grossly infected urine. Wood[19] in 1915, after having previously used staphylococcus vaccines in several cases of pustular eczema, tried autogenous streptococcus vaccines obtained from foci in the mouth, nose and throat, with good results in four cases.

From this time on, reports become more and more numerous so that only a few can be mentioned here. Chiefly some of those dealing with the use of vaccines in bronchial asthma will be reported. In 1917, Sicard[14] reported the use of autogenous streptococcus (hemolyticus and viridans) vaccines obtained from sputum cultures. He gave the vaccine subcutaneously and felt that a local reaction was necessary in order to obtain good results. Hutcheson and Budd[9] used a mixed vaccine containing usually streptococcus, staphylococcus and micrococcus catarrhalis, together with a small amount of the broth filtrate. They considered the good results to be due to the presence of an anaphylatoxin produced in vitro by the bacteria and called attention to the possibility of anaphylactic shock if the interval between injections was allowed to go over eight to ten days. Rogers,[12] in 1921, reported forty cases in which he used autogenous streptococcus vaccines, obtained from sputum cultures, subcutaneously, with only 15 per cent failures. G. Tyler Brown[2] differentiated between bacterial or non-sensitive asthma and protein-sensitive asthma. He cultured the sputum and isolated each organism present, made a vaccine from each and tested the skin intradermally with each organism, used the twenty-four hour reaction as a guide, and used only those in treatment which reacted positively. He, too, felt that a local reaction was necessary in order to obtain results. All but 10 per cent of his 144 cases were relieved or cured. Rackemann[10,11] in various articles concluded that just as good results were obtained with stock vaccines as with the autogenous, but insisted that relief from asthma came only with and was proportional to the local reaction following subcutaneous injection. Thomas and Touart[15] cultured the sputum and all possible foci, made a separate suspension of each organism isolated, and used those which gave a positive intradermal twenty-four hour reaction. They continued the injections for several weeks after relief was obtained. They also reported a case sensitive to all kinds of feathers which showed no improvement when the feathers were removed from the environment. The administration of vaccine resulted in marked improvement, which became complete when the feather pillows were again removed. Later on, the use of the pillows was not followed by recurrence.

Feinberg[7] states that in the majority of cases bacterial vaccines act in a non-specific manner, but Vaughan[17] denies this and calls attention to evidence pointing conclusively to the occurrence of a specific bacterial allergy in many cases, although he agrees that the best results from vaccines are obtained when a local reaction occurs. He uses vaccines for two purposes, namely, to desensitize and to immunize. For the former, small doses must be used; and for

the latter, large doses. Voorsanger and Firestone[18] do not believe in a specific action of vaccines. They call attention to the frequent beneficial effect of stock vaccines in cases of asthma in which the onset could not be traced to an infectious process.

Bray,[1] in his book entitled "Recent Advances in Allergy," reviews in some detail the role played by bacteria in asthma. He calls attention to the work of Wilmer and Cobe (1933), who compared the incidence of bacteria in the sputa of five hundred asthmatics and two hundred controls. In asthmatics, the highest incidence was that of various types of streptococci, 67.4 per cent of all cases; while in the controls the highest incidence was shown by staphylococci (albus and aureus), 84 per cent of all cases. They further state that similar results are obtained in treatment with stock and autogenous vaccines unless only those autogenous vaccines are used which give a positive skin reaction. The latter give the best results. However, he also cites the work of Knott and his co-workers, who claimed that, in eighty-five cases out of one hundred thirty-two, the sputum was eosinophilic. Forty-two of the eighty-five showed Gram-negative bacilli in the plugs of bronchial secretion. In the remaining forty-seven cases, the sputum did not contain eosinophiles and only six of these showed Gram-negative bacilli in the plugs. Calling attention to the work of Harkavy (1929), who found a spasm-producing substance in the sputum of asthmatics during paroxysms, which was absent during the free interval, Knott and Oriel (1930) suggested the possible origin of these histamine-like substances from the Gram-negative bacilli, since culture extracts from these organisms have been known to give effects similar to those obtained from the sputum itself. Knott concluded, however, that Gram-negative bacteria can produce clinical asthma only in those people whose bronchi are already in such a state that slight further stimulation will produce bronchospasm. Acton and Dharmendra (1933) failed to confirm the histamine-like effects produced by cultures of the Gram-negative bacilli.

Many recent reports have been made of the use of vaccines in the treatment of asthma. Among these is that of Rozendaal and Maytum[13] in the United States, who used both autogenous and stock vaccines with similar results from each and concluded that the effect produced was non-specific. Vallery-Radot, Blamoutier and Nitti,[16] in France, found that the hemolytic and viridans types of streptococcus were predominating organisms in the sputum of patients suffering from asthma, as well as those having chronic bronchitis. They believe that bacterial vaccines act only in those cases with bronchitis and that the improvement in the asthma is secondary to the improvement in the bronchitis. Harley,[8] in England, subdivides asthma into four types: (1) those hypersensitive to non-bacterial substances; (2) the same plus secondary infections or toxemias; (3) bacterial asthma; (4) the same plus secondary non-bacterial sensitizations. He states that vaccine therapy is indicated in types 2, 3, and 4.

Our interest in the use of autogenous vaccines began about ten years ago in the treatment of chronic arthritis. As the allergic manifestations of this group of disorders came more and more to the foreground and as common knowledge indicated that many of the allergic group of conditions, chiefly bronchial asthma, had their onset during or following acute infectious episodes, we gradually extended our use of autogenous vaccines to include this latter group. As most of the reports which appeared incriminated the various types of streptococci as the predominant organisms in both groups, our efforts have come to be directed toward their isolation and use in autogenous vaccines. To begin with, they were used subcutaneously exclusively. Although good results were obtained, progress was often slow and indefinite. When Clawson,[4] of the University of Minnesota, reported his work on the intravenous administration of streptococcus vaccines in chronic arthritis, we gradually adopted the method in our work.

In the series of cases about to be reported, cultures were made from the sputum and any possible focus or foci of infection, including the nasal mucosa, the washings from sinus irrigations, the pharynx, the tonsils (preferably after removal), pyorrhea pockets, roots of extracted teeth showing apical abscesses, the cervix uteri, stools and directly from the rectal mucosa through the proctoscope. Plain dextrose broth and dextrose brain broth were the only media used except in an occasional case in which difficulty was experienced in obtaining the strep-

TABLE I

Type of Cases	Number of Cases	Intravenous	Subcutaneous	Complete Relief	Marked Improvement	Moderate Improvement	No Improvement
1. Bronchial asthma	14	12	2	4	5	2	3
2. Miscellaneous group	9	3	6	2	6	1	0
A) Allergic rhinitis	4	1	3	1	2	1	0
B) Recurrent sinusitis	1		1		1		
C) Generalized eczema	1		1		1		
D) Chronic urticaria	1		1		1		
E) Chronic conjunctivitis	1	1			1		
F) Chronic iritis	1	1		1			
Total	23	15	8	6	11	3	3

tococcus in pure culture. In such cases the mixed culture was plated out on blood agar and the pure culture obtained by subculturing individual colonies. The media had previously been titrated to a pH of 7.6. It was considered extremely important that culture media be at incubation temperature at the time the culture was taken and then transferred immediately to the incubator. It was felt that in this way pathogenic streptococci could be more easily isolated.

The bacterial sediment was separated from the supernatant broth and washed three times with normal saline. The organisms were then suspended in normal saline, subjected to heat at 60° C. for ninety minutes and the suspension tested for sterility before being used. Two drops of a 4 per cent phenol solution were added to 10 c.c. of the suspension as a preservative. A bacterial count was made in order to standardize the vaccine. This suspension was then used as a stock vaccine from which dilutions were made for administration. The undiluted vaccine was used in making skin tests, the intradermal method being used. In performing the skin test, just sufficient material to form a small bleb (usually about 0.01 cc.) was injected. If streptococci were isolated from more than one focus, skin tests were made of each, and only those used which gave positive reactions.

The initial dose of the vaccine varied from twenty-five thousand to one hundred thousand organisms. (Protein determinations have been done on a few of the vaccines. The results of these indicate that this dose contains approximately 0.00001 to 0.00004 mgm. protein.) To begin with, injections were given every three to five days. As improvement became established, the interval was lengthened to five to seven days. The interval was never allowed to go over seven days without drastically reducing the dose. The size of the dose was gradually increased until definite improvement was noted. No further increase was made as long as improvement or relief of symptoms was maintained. Any reaction following a dose called for a marked reduction in the next dose to one-fourth or one-tenth of the preceding dose. If possible, the injections were continued over a period of at least six months so as to prevent recurrences. In several cases they have been continued for periods of two to three years, with occasional rest periods of six to eight weeks.

The methods used in this study differ, then, in three main particulars from those used by others: (1) the vaccine is given intravenously in the majority of cases; (2) extremely small doses are used and a great deal of caution exercised in determining the size of each succeeding dose; and (3) long periods of continuous desensitization are employed for the purpose of preventing relapses.

Table I shows the total number of cases treated, the distribution according to diagnosis, the number treated intravenously and subcutaneously respectively, and the results of treatment. It will be noted that fourteen of the twenty-three cases were cases of bronchial asthma. In the miscellaneous group, the cases of recurrent sinusitis, chronic conjunctivitis and chronic iritis were included because they presented definite evidence of sensitization to bacterial proteins. The vaccine was administered intravenously in fifteen cases, subcutaneously in eight

cases. In reviewing the results of treatment, it is seen that seventeen of the twenty-three cases obtained complete relief or nearly so. There were three failures, all cases of bronchial asthma. Further reference to these results will be made later.

of the eighteen cases tested intradermally with their own vaccine showed an immediate positive reaction of the protein sensitization type.

The result of studies shown in Table II is in direct contradiction to the statements made in many of the previous reports, namely, that the

TABLE II

	Asthma	Misc.	Total
Total cases	14	9	23
Infectious cases	12	6	18
Personal history of other manifestations of allergy:			
Total	7	5	12
Infectious	6	3	9
Family history of allergy:			
Total	6	3	9
Infectious	6	2	8
Cases with positive skin reactions to other proteins:			
Total—few	4	0	4
many	8	6	14
Infectious—few	3	0	3
many	6	4	10
Skin reaction to vaccine:			
Total number done	11	7	18
Immediate reaction	10	6	16

In Table II the number of cases giving a history of onset associated with or following an acute infectious process is shown. These cases are designated, for convenience, the infectious cases. Eighteen of the twenty-three cases had such an onset. This Table also indicates the number of cases with a personal history of other manifestations of allergy and those with a family history of allergy. These figures were obtained from routine histories. It is felt that the number of positive histories would very likely have been increased if more detailed histories had been obtained. It shows, however, a similar distribution of positive histories in the infectious group as in the entire series. This Table also shows the number of cases with positive intradermal tests to proteins other than bacterial. These were carried out in eighteen cases of the series. Each case was tested with a large number of substances, especially foods. All cases gave a certain number of positive reactions. A subdivision was, therefore, arbitrarily made into those with few reactions (less than ten), and those with many. Again, a similar distribution is seen in the infectious cases as in the entire series. This Table finally reveals that sixteen bacterial or infectious types of cases belong to a separate insensitive group in which family histories of allergy and positive skin reactions of the immediate protein sensitization type are rare.

Very little difference in the end-results was noted between those given vaccine subcutaneously and those given it intravenously. The definite clinical impression was gained, however, that more prompt and precise improvement was obtained in most of the cases receiving the vaccine intravenously.

In two cases in which the administration of the vaccine was begun intravenously, it became necessary later to change to the subcutaneous route of administration because of severe reactions. In one of these, the reactions appeared soon after treatment was started even though minute doses were given. Soon after the subcutaneous method was begun, a slow but steady improvement resulted which finally led to complete relief. In the other case, intravenous administration was originally followed by prompt and almost complete relief of symptoms. This continued for about two months, when reactions to each dose began to appear until almost con-

stant asthma was again present in spite of drastic reduction of dosage. The subcutaneous method was then substituted and recently gradual improvement has again definitely become apparent.

Two of the three failures can possibly be explained on the basis of incomplete management. In one case, after showing considerable improvement, the patient discontinued taking the vaccine. After a few weeks he developed a severe recurrence and died suddenly during a period of almost constant asthma. Examination previously had shown evidence of myocardial disease, but it was definitely felt that he was suffering from a true bronchial asthma rather than a cardiac asthma. The second case was that of a man, 44 years old, somewhat below par in intelligence. He had had asthma for fifteen years, the onset following an acute respiratory infection. He was sensitive to many foods and pollens, in addition to bacteria. It was almost impossible to obtain proper coöperation in carrying out his dietary management and this, no doubt, accounted at least partially for our failure. Another case of severe asthma, not included in this series because of insufficient treatment, had been given four or five intravenous doses of an autogenous vaccine at 5-day intervals. The administration of the next dose was then unavoidably delayed until the 8th day. Although the dose was the same as that previously given, it was followed by a severe exacerbation of her asthma within a few hours. Further treatment was refused.

Good results in this series can be illustrated by the following cases.

A girl, aged fourteen, had developed a severe asthma following a bronchopneumonia four years previously. Her mother and one aunt had had asthma and there was hay fever in her father's family. She had suffered previously from frequent head colds. Before coming to us, she had been studied carefully by another physician. She had been found sensitive to many foods by skin tests, but dietary management on this basis had produced no results. We felt that eliminating all the foods to which she was sensitive involved the danger of dietary deficiency, so she was placed on a well-balanced diet with high vitamin content and limited in carbohydrates, without regard to the skin tests. She was given calcium salts by mouth. This management produced very little change in her asthma, but, almost immediately after small doses of vaccine were started intravenously, a marked improvement occurred. This has been maintained for a year and she has been able to return to school.

Good results have not been confined to those cases with a history of onset following acute infections.

A physician, aged thirty-one, first came to Minnesota in January, 1936. He had previously never had seasonal hay fever although he had been subject to frequent head colds. In August, 1936, he was taken with a typical severe hay fever which persisted through the ragweed season. Instead of being relieved when frost came, however, the severe allergic type of rhinitis persisted through the fall and winter. He was found to be markedly skin-sensitive to many foods and pollens, including ragweed. A streptococcus was isolated from his nasal secretions. The intravenous administration of this vaccine was promptly followed by marked relief of his symptoms. This year he has been successfully carried through the ragweed season on a combination of his vaccine intravenously and pollen extracts subcutaneously.

In conclusion, then, we would like to suggest the following points for further study:

1. The so-called bacterial or infectious types of allergy, especially asthma, are fundamentally similar to other forms of allergy.

2. The beneficial effect produced by minute doses, both subcutaneously and intravenously, are probably due, not to a foreign protein shock therapy, but rather to a specific type of desensitization.

3. The intravenous route of administration produces more prompt and precise results than the subcutaneous. Severe reactions may be expected following intravenous administration if too large doses are used or too long an interval is allowed to elapse between doses.

4. The beneficial effects of vaccines in allergic states, especially asthma, are not confined to the primary bacterial allergies but may also be of value in certain cases in which the bacterial allergy is secondary.

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ACUTE MASTOIDITIS*

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IN treating the subject which has been assigned to me, it is obvious that only the high spots can be touched within the limits of the time which is available. I have therefore thought best to emphasize some of the most important points, as they concern the general practitioner, and make some comment on certain faulty conceptions which are quite commonly observed by otologists.

The most commonly met picture of acute mastoiditis is that of a post-aural pain, tenderness and swelling following a discharge from the ear which has continued for some time and has lessened prior to the occurrence of these symptoms. These symptoms indicate an involvement of the mastoid cells, with more or less bony necrosis, and are supposed to be due to an extension of middle ear suppuration because of pressure resulting from poor drainage from an opening in the drum head.

The chief considerations are the relief of pain and the prevention of intracranial complications which may occur as the result of extension of the infection inward instead of outward. Surgical treatment consists in opening the mastoid bone, curetting out softened bone and keeping the wound open by gauze dressings until it has healed by granulation—a process requiring a varying length of time, and usually evidenced by a good sized depressed scar and quite probably serious damage to hearing.

Adhering too closely to this general idea of acute mastoiditis often results in some fallacious reasoning as to pathology, diagnosis and treatment.

While the most common avenue of infection of the middle ear is through the eustachian tube, by continuity of tissue from an infected naso-pharynx, the infection being forced through a patent tube by blowing the nose, coughing, sneezing and vomiting, it should be borne in mind that this infection may be carried through blood and lymph channels.

The type of infection is a matter of considerable importance. Frequent studies of smears from a discharging ear give important information as to the pathological probabilities which are present. Streptococci, especially the mucosus capsulatus, are liable to be very destructive to bone. Predominance of staphylococci points to a long drawn out infection.

Infection of the middle ear practically always means a coincident infection of the mastoid antrum, where germs of a more virulent type, especially if there is not free drainage, find an easy entrance to adjacent mastoid cells. There is a certain analogy between the bony cavities of the temporal bone which are connected with the mucosa of the naso-pharynx and those of the nasal accessory sinuses. Most acute infections of the sinuses clear up spontaneously if there is good drainage. So also do infections of the middle ear, many of which drain through the eustachian tube. If the eustachian tube is swollen and does not permit free drainage it is the pressure on the drum as well as the inflamed mucosa which causes pain, especially in the presence of a virulent infection.

It is highly probable that most cases of acute mastoiditis were coexistent with a middle ear infection from the start, and that many of them clear up if given a chance to drain adequately. Adequate drainage of the middle ear when there is a bulging drum head or if there has been a spontaneous rupture with pus in the external meatus must be borne in mind as an essential in heading off mastoiditis. I use the words

*Read before the annual meeting of the Minnesota State Medical Association, Duluth, Minnesota, June 29, 1938.

"heading off" advisedly, for it implies not only the prevention of mastoid infection, but the checking of a beginning infection as well.

One of the fallacies too frequently met is the notion that as long as an ear is draining there is no cause for concern. It is essential to actually see the drum head and note the size of the perforation. If it is not freely open it should be enlarged, repeatedly if need be, to provide a safety valve of adequate drainage.

If there is post-aural pain, even if there is no discharge, the mastoid should be carefully investigated, for there is sometimes involvement of the mastoid without aural discharge. Pressure over the antrum opening of the mastoid emissary vein or over the mastoid tip will be painful in most cases although if the bony cortex is very thick this tenderness may be slight.

Edema will be noted in many instances when the cortex of the mastoid process is thin, as in infants, but does not necessarily indicate the need for operation. However, a distinct post-aural swelling, especially if the ear is displaced, is very suggestive of mastoiditis. Care should be taken to exclude a boil in the external canal which may produce both edema and tenderness similar to mastoiditis. If the tenderness is more marked when pressure is directed toward the external meatus instead of away from it, furunculosis should be suspected. A swelling of the posterior superior wall of the external canal adjacent to the drum head is significant of involvement of the mastoid antrum, which lies immediately within.

The presence of post-aural pain, tenderness and swelling of the external canal, often called the "dip," usually a diagnosis of probable mastoiditis. Temperature and pulse changes give further information, but there may be a well developed mastoiditis without much disturbance of temperature or pulse. A steady high temperature suggests a blood infection or meningitis, while a sudden high temperature, followed by a drop and chill, point toward thrombosis of the lateral sinus, which lies in immediate relation with the cells of the mastoid.

The blood picture is of value as in infections elsewhere. Persistence of a high polymorphonuclear percentage is an indication for operation.

Swelling below the mastoid tip is sometimes mistaken for a neck abscess not associated with ear infection. This is not infrequently due to an extension of infection from one of the larger mastoid cells found in the tip, the so called Bezold's mastoiditis. Likewise the cells which are found in the root of the zygoma may be involved and swelling there may throw one off the track of diagnosis if he is looking for all the classical symptoms, including post-aural swelling.

It is well to observe here that infection of the mastoid bone may jump across a sound area, through vascular channels, and be overlooked at the time of operation, unless one makes it a point to make a complete exenteration of the mastoid cells, a standard procedure in operating. Any discharging ear is dangerous. Heath of London used to refer to the mastoid as "the aural appendix." It is wise to have the same respect for this appendix as for the one found in the abdominal cavity.

An ear which has been discharging for more than a week without diminution should be held under suspicion. The drainage must be kept free, and the character of the infection watched, especially if streptococci are found. Prolonged discharge points to involvement of an area larger than the tympanum. It means also damage to hearing in proportion to the duration of the discharge. While one may not be arbitrary about the matter, it is a wise rule to conclude that a persistent ear discharge lasting three weeks means mastoid infection, and quite probably the need for operation.

It is true that Nature is wonderful but I believe it is wiser to err on the side of early operation, save a few more lives and many more hearing ears, than to be too conservative, which attitude is popular at present.

It is true that a reasonable delay in operating allows time for walling off of the infected area, but this calls for the exercise of sound surgical judgment, which with the experienced otologist becomes almost intuitive. It is also true that properly taken and properly interpreted x-ray films are valuable, but can not replace accurate clinical observation.

Time will not permit more than a passing reference to mastoidectomy, and post-operative care. However, it should be emphasized that mastoid surgery calls for a degree of technical skill, not only in determining when but how to operate on an individual case. The post-operative care is also important.

For many years I have used the blood clot method, and have seen about 60 per cent of my cases heal with primary union, with less damage to hearing and with much better cosmetic results than is obtained by open methods. The method calls for care in completely removing all infected and devitalized tissue, the avoidance of antiseptics in the wound, careful asepsis, and subcutaneous closure, preferably with copper wire.

Post-operative care calls for frequent change of ear drains, making sure there is a free incision of the drum head at operation. The procedure amounts to practically converting a mastoiditis into a simple otitis media. If the wound should break down it is a simple matter to spread the lower angle enough to insert a strip of rubber tissue, which I have found to be all the drainage required in any mastoid wound. The use of gauze packs is painful to the patient and damaging to regenerating tissue. The wire sutures are easily removed with a single pull in about a week. A collodion cocoon in cases which have a slight oozing is fully as satisfactory, and much less unsightly than a head bandage.

The question sometimes arises as to the advisability of sending patients home for post-operative dressings. I believe this is inadvisable, for the technic of making mastoid dressings calls for almost as much skill and judgment as operation. Further it is important to observe the progress of the middle ear closely in order that the return of normal function may be given every chance.

It should be borne in mind as stated before that we are concerned not only with saving life but with the conservation of hearing.

Discussion

DR. WALTER E. CAMP, *Minneapolis:* The usual features of acute mastoiditis are well understood by both general practitioners and otologists. Dr. Parsons has very forcibly emphasized some of the unusual features in both surgical and non-surgical mastoiditis. The diagnosis of surgical mastoiditis in most cases is not difficult; not infrequently, however, cases are encountered which are very misleading.

In all cases of acute suppurative otitis media the mucosa of the mastoid antrum and mastoid cells is involved to a variable degree. The amount of involvement of the mastoid, the severity of symptoms, the question of surgical intervention, and liability or frequency of serious complications are features which are determined by such factors as: (1) type and virulency of the invading organism; (2) speed and adequacy of drainage of the middle ear; (3) the anatomical type of mastoid involved; (4) immunilogical and therapeutic response of the individual affected.

In some cases, acute mastoiditis, even with some bony cell destruction, will heal without surgical interference. This occurs most often in cases where the invading organisms are not exceedingly virulent and the cells surrounding the mastoid antrum are large enough not to be blocked by edema and granulations.

Early and adequate drainage of the middle ear as emphasized by Dr. Parsons is exceedingly important to prevent surgical mastoiditis. Acute mastoiditis, due to hemolytic streptococcus, will, in some cases, respond early to sulphanilamide.

In this usual routine of office and clinical work one should always be alert for the unusual or atypical type of mastoiditis with a minimum of clinical symptoms and signs. During the past five years it has been my privilege to see five of these unusual cases. Three of them were cases of frank otitis media in which early and adequate drainage was secured. The patients were symptom-free except for pain and slight aural drainage. There was no fever, no tenderness of the mastoid, no prolapse of the posterior canal-wall, no leukocytosis. Roentgenograms in these cases showed only slight cell destruction. All three cases developed meningitis, two from direct extension through the petrous pyramid and one through vascular channels. The other two cases were of the so-called latent or "silent" mastoiditis. The ear drums were normal. There was no perforation or history of aural discharge. Both these patients developed lateral sinus thrombosis and bacteremia, and both survived following the required operation.

These unusual cases should keep one always alert and should emphasize the clinical importance of routine and, if necessary, repeated x-rays. They should also emphasize the clinical importance of one very urgent symptom—namely, pain. Persistent mastoid pain or headache, even in the absence of any other clinical sign, except possibly positive x-ray, should be sufficient evidence to justify exploration of a questionable mastoid.

The optimum time for surgery in acute mastoiditis is after a variable amount of necrosis has developed and opportunity given for the development of some degree of local tissue immunity—an interval of from ten to fifteen days in the usual case. In some severe infections, however, especially those complicating scarlet fever and pneumonia, a "malignant" type of mastoiditis can develop within four or five days and demand early operation.

THE PROBLEM OF GASTRODUODENAL HEMORRHAGE*

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ALTHOUGH it is true that bleeding from peptic ulcer may occur without serious consequences in many instances, there are few more urgent clinical situations than those presented by massive gastroduodenal hemorrhage and few that on occasion may make such heavy demands on the courage, judgment, and decision of the physician. The problems of diagnosis and prognosis hinge upon a decision as to the source of bleeding, the type of vessel involved and the rate at which blood is being lost; the problems pertaining to treatment are concerned with meeting the immediate emergency caused by the hemorrhage, the prevention of further bleeding, and later, the matter of dealing with the hemorrhagic lesion itself. The present discussion will be concerned chiefly with brief considerations of the foregoing points with special reference to current views on the problems of treatment.

Statistical Considerations of the Sources of Hemorrhage

The sources of bleeding, as determined from a series of 688 consecutive cases of hematemesis taken from the files of The Mayo Clinic, have been recently tabulated by Rivers and Wilbur.[31] It was found that in about 90 per cent of cases the bleeding came from demonstrable intrinsic lesions in the stomach or duodenum; that in about 5 per cent of cases diseases of the liver or spleen were responsible, hemorrhage ensuing from ruptured esophageal varices; and that in the remaining 5 per cent of cases the source of bleeding was ascribed either to miscellaneous or unverified causes. This miscellaneous group included rare instances of bleeding due to such uncommon causes as blood dyscrasias and hemorrhagic cholecystitis; in this group it was not possible to exclude erosive lesions of the gastroduodenal mucosa.

Since most of the hepatosplenic lesions present a fairly definite clinical picture and constitute an entirely different problem in treatment, the discussion to follow is concerned only with the 95 per cent of cases in which lesions of the stomach or duodenum were known to be present or in which the source of the blood lost was not definitely demonstrable.

By far the commonest cause for diffuse gastro-intestinal bleeding in the 90 per cent of cases in which it is due to an intrinsic gastroduodenal lesion appears to be duodenal ulcer; it accounted for the bleeding in 57 per cent of the cases in the series just mentioned. Secondary anastomotic or recurrent peptic ulcer was the source of hemorrhage in 14 per cent of the cases, and gastric carcinoma ranked third, making up 12 per cent of the group. Gastric ulcer was responsible for hemorrhage in 6 per cent of cases. Miscellaneous lesions of the stomach, including benign tumors and polyps, were the least common cause, comprising only 1 per cent of the total. Allen's figures on the causes of massive gastroduodenal hemorrhage in 231 cases showed a somewhat different distribution of lesions, the incidence being as follows: duodenal ulcer 41 per cent, carcinoma 20 per cent, gastric ulcer 18 per cent, gastrojejunal ulcer 3 per cent, and miscellaneous or unverified lesions 2 per cent; in the remaining 16 per cent of cases the bleeding came from esophageal varices. Since gastric cancer usually produces cachexia before severe bleeding occurs and since benign tumors are decidedly rare, these causes may be further eliminated from discussion at this point and attention centered on bleeding peptic ulcer.

Bleeding Peptic Ulcers

How many ulcers bleed? Figures from different parts of the world vary considerably, but it is quite generally agreed that from 12 to 20 per cent of peptic ulcers bleed at one time or another. This percentage does not, of course, include the much larger group in which the loss of blood is microscopic and relatively unimportant. In addition to the "certified" cases of bleeding ulcer there is a fairly large group included in most series of cases with gastroduodenal bleeding in which the presence of peptic ulcer has been suspected but not conclusively proved. Since the advent of gastroscopy it has been possible to

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Read before the meeting of the Minnesota State Medical Association, Duluth, Minnesota, June 30, 1938.

segregate a considerable number of patients who bleed because of ulcerative gastritis with mucosal erosions; as a group these patients may be said to have authentic histories of ulcer and negative roentgenologic findings. During the past year a number of patients coming under this classification have been subjected to gastroscopic examination at the clinic and have been found to have erosive lesions of the stomach of such size and character as to account for the hemorrhage. It is now reasonably certain that many patients to whom the diagnostic terms "gastrostaxis" or "gastrorrhagia" have been applied are in reality the victims of hemorrhagic gastritis. Alcohol appears to figure largely in the production of this type of gastritis, as Benedict's observations show, although it is certainly not the sole cause.

The pathologic changes in an ulcer which lead to hemorrhage have been discussed many times and need be considered only briefly here. Many small lesions must bleed freely at the time of their formation, as is doubtless the case with the hemorrhagic erosions found in gastritis. There is good experimental evidence to substantiate this opinion, as shown by the studies of Stalker, Bollman and Mann[35] on the formation of ulcers produced by the administration of cinchophen. Other lesions apparently bleed during the stage of healing when the bud of granulation tissue that forms at the base of an ulcer becomes injured or dislodged (Caylor).[11,12] Massive or fatal hemorrhage is most often due to erosion of an artery, usually a branch of the pancreaticoduodenal artery, lying in the base of an ulcer; this is obviously due to extension of ulceration through the submucous and muscular coats of the stomach or duodenum, a condition which is most frequently found in very active inflammatory and penetrating ulcers.

Factors Provoking Hemorrhage

A great many gastroduodenal hemorrhages appear out of a clear sky when the patient is having no symptoms of ulcer at the time; no good explanation can be offered as to why bleeding begins under such circumstances. In other cases some definite cause can often be found, of which perhaps the commonest is unaccustomed physical exertion. For instance, it is not uncommon for a patient to bleed following heavy work, lifting, violent exercise, or a long period at the wheel of an automobile; this is most often noted if the individual in question has been living a sedentary life and suddenly engages in vigorous physical activity. The abuse of alcohol is another common exciting factor, bleeding being particularly likely to occur after an episode of heavy drinking. Rivers[29] has emphasized the importance of focal and intercurrent infections in producing hemorrhagic gastroduodenitis, while Crohn and Shwartzman[16] have invoked the Shwartzman phenomenon as an explanation for the reactivation of a hemorrhagic ulcer following respiratory and other infections. In other words, there is reason to believe that certain infectious processes may produce either fresh hemorrhagic lesions or cause bleeding in a chronic ulcer.

A fourth factor relating to the cause of hemorrhage, which has only recently been considered, has to do with the possible influence of vitamin deficiency. Most patients with peptic ulcer subsist on diets which may be somewhat limited, especially in respect to fresh foods and vegetables, and there are many patients who voluntarily make even more drastic reductions in their intake of food. Many avoid citrous fruits, either because of the discomfort produced or because they feel that such fruits are "too acid" for their stomachs. Rivers and Carlson[30] have noted low levels of cevitamic acid in the blood and urine of certain individuals with hemorrhagic peptic ulcer and have also demonstrated an increase in capillary fragility in some such cases. Do these patients suffer from a latent or subclinical form of scurvy? Curiously enough, the older literature makes little reference to severe gastro-intestinal bleeding in advanced or proved scurvy except in the terminal stages of the disease. But, there are nevertheless certain well authenticated cases of gastro-intestinal bleeding which resulted from an established vitamin C deficiency, acting independently or through the medium of a peptic ulcer. Attempts have been made to determine the degree of unsaturation of the organism with cevitamic acid by the administration of large single doses and determinations of the amounts eliminated in the urine during the next few hours (Lazarus).[20] The limits of normal for this procedure have not as yet been clearly established and, consequently, figures based on this evidence cannot be taken at face value. Vitamin P, a flavone glucoside closely related to cevitamic acid, may enter into the

picture since it seems to be concerned with the maintenance of normal capillary permeability and possibly with the absorption of cevitamic acid. The fat soluble, antihemorrhagic vitamin K may also be deficient in the diet of some individuals; we have recently noted one patient with recurring gastroduodenal hemorrhage who had been on a limited diet and whose prothrombin clotting time was found to be markedly prolonged. In this case the administration of vitamin K corrected the apparent prothrombin deficiency and possibly aided in the control of the bleeding.

This antihemorrhagic vitamin K is found in close association with another substance which may be of even greater importance in the genesis of bleeding from an ulcer; this is the gizzard-erosion factor, first noted by Almquist and Stokstad,[3,4] which is responsible for hemorrhagic erosion of the gizzard of chicks fed on deficient diets. Cheney[18] has recently directed attention toward the possible significance of this factor in the production of gastroduodenal hemorrhage. Much more information is required in respect to the distribution of the various vitamins in the diet of patients with ulcer and the rates of absorption under normal and pathologic conditions before a final statement on the matter can be made. It does seem, however, that vitamin deficiency may be of particular importance in the rather large group of cases of hemorrhage of indeterminate origin when a gastro-intestinal lesion adequate to explain the bleeding cannot be demonstrated. Also, the possible importance of vitamin deficiency may logically be advanced as an argument in favor of early and liberal resumption of a normal diet following hemorrhage.

The Clinical Course and Complications in Cases of Moderately Severe Gastro-Intestinal Hemorrhage.

It is well known that many bleeding ulcers are of the so-called silent type in that they produce few of the usual dyspeptic symptoms at any time. In such cases hemorrhage often appears suddenly and without warning. In older patients there may be definite prodromal symptoms of increasing ulcer dyspepsia, sometimes characterized by clinical evidence of penetration. In a minority of cases there may be minor dyspeptic symptoms accompanied by melena, with a gradual falling off of the blood count for several days before actual gross hematemesis appears.

The symptoms of massive bleeding are too well known to require elaborate description; they consist as a rule of melena, hematemesis, profuse sweating, and subsequent collapse, but not necessarily occurring in this order. The systemic evidence of hemorrhage may precede the actual appearance of blood in the stools and vomitus. Examination of the patient, seen immediately following or during an active hemorrhage, reveals little but pallor, tachycardia and hypotension, and a small pulse pressure. The rapid "thready" pulse of hemorrhage is the common expression of this last-named phenomenon. Other patients are admitted to the hospital in a condition suggesting shock. Blood counts taken on admission are extremely variable, depending on the rate of bleeding, the amount of blood lost and the previous level of hemoglobin. There may be evidence of hemoconcentration in the first specimens of blood examined, presumably because of the large amount of fluid lost with the shed blood and as a result of sweating. Therefore, the true magnitude of the hemorrhage may not be appreciated until adjustments in the body fluids have had time to occur and the normal plasma content of the blood is restored. This may explain the fact that the blood counts tend to fall even after the actual hemorrhage has ceased. In sixteen cases observed by Noth and Wilbur,[26] the average concentration of hemoglobin taken at its lowest point was 6.5 gm. per 100 c.c. and the number of erythrocytes 2,250,000 per cubic millimeter of blood; the extremes of hemoglobin variation were 3.2 and 12.9 gm., respectively, and those for the erythrocyte counts 1,200,000 and 4,800,000.

The chemical constituents of the blood often show very marked changes, consisting of a fall in plasma proteins and a marked elevation in blood urea and nonprotein nitrogen. The fall in circulating protein is comparable to that produced by plasmapheresis, although the nature of the last-mentioned condition, the so-called extra-renal azotemia, is not well understood. It has been variously attributed to dehydration, to the effects of protein destruction in the body, to a temporary falling off in renal function produced by a falling blood pressure and a reduced rate of glomerular filtration (Alsted[5,6] and Meyler[23]),

and even to an actual degeneration of the epithelium of the kidney produced by anemia. Resorption of the blood from the intestinal tract appears to play a definite part in the process, as has been shown by the fact that patients who vomit most of the blood or whose stomachs have been aspirated have a less striking rise in urea than those who retain blood in the intestinal tract. Slight fever is often noted during the period when the intestinal tract is full of blood; the reasons for this are as yet unknown.

For how long a period does active bleeding persist? There is good reason to believe that in many nonfatal cases there is only one large hemorrhage. The stools, however, may show blood for several days thereafter because of the length of time required for the intestinal tract to empty itself. It is estimated that some eight to twelve days are required before the stools are negative to the benzidine test after a single hemorrhage, which incidentally, appears to be about the time required for a single dose of barium sulfate to be completely eliminated from the intestinal tract. In fatal cases, continuous or recurrent bleeding is the rule and blood may be lost with great rapidity. In other cases it may be possible to detect two or more episodes of hemorrhage a few days apart, and in still other cases, there may be evidence to show that continuous, slow bleeding is taking place.

In the case of an otherwise healthy individual regeneration of blood takes place rapidly after gastroduodenal hemorrhage. Schiødt[33] has noted that the erythrocyte count reaches a level of about 4,500,000 per cubic millimeter thirty-three days after the lowest level has been recorded, this peak being attained at about the same time regardless of the level to which the count fell. Curiously enough, he found little or no evidence to indicate that transfusion increased the rate of regeneration after hemorrhage.

The Mortality Rate of Gastroduodenal Hemorrhage From Ulcer

It is believed that in from 25 to 30 per cent of of all fatal cases of peptic ulcer death is due to hemorrhage (Monroe and Emery[24]). Figures for the mortality rate of individual gastroduodenal hemorrhages arising from peptic ulcer, however, cover the widest possible range and are, for this reason alone, extremely difficult to interpret. Babey's[7] figures are a case in point; he cited mortality figures ranging from 1 to 25 per cent in various hospitals in Europe, Great Britain, and the United States. The most probable explanation for these wide variations is that in some hospitals only patients with the more serious degrees of bleeding are admitted whereas, in others, all patients who show any signs whatever of loss of blood are taken into the hospital for observation. In order to get any accurate figures for mortality it would, therefore, be necessary to classify hemorrhages on the basis of their severity, a problem which Allen[2] and Benedict[9] have attempted to clarify.

Even with due allowance for this factor there are some sectional variations in the mortality rate from hemorrhage which are not easily explained. These sectional differences, if taken at their face value, seem to indicate that a hemorrhagic ulcer in some sections of the world is a distinctly more fatal lesion than in others. At Guy's Hospital in London only twenty-five deaths from gastroduodenal hemorrhage occurred in twenty years (Hurst and Ryle[19]), whereas the mortality rate from hemorrhage in the Scandinavian countries seems to range from 10 to 15 per cent. At King's County Hospital in Seattle, Blackford and co-workers[10] noted that the mortality rate from hemorrhage was about 20 per cent and Leon Schiff[32] has noted a 14 per cent mortality rate at the Cincinnati General Hospital. Goldman's[17] mortality figures (San Francisco) are also high (11 per cent).

The mortality rate in Minnesota hospitals and clinics seems to be definitely lower. The fatalities which we have had at the clinic are not a reliable guide since many patients with severe bleeding could hardly have been brought from any distance and the local population is too small to provide any large number of serious cases. The mortality rate at the clinic for individual hemorrhages, however, is well under 5 per cent. Regnier,[28] of the Minneapolis General Hospital's surgical staff, has kindly supplied me with figures which indicate that the mortality rate in that institution is less than 3 per cent; Noble[25] of the Ancker Hospital (Saint Paul) expresses the belief that the mortality rate at that institution was approximately 2.5 per cent. No satisfactory figures are available for Saint Mary's Hospital at Duluth or for the University Hospital (Minneapolis) but in the opinion of the consultants in these hospitals the mortality

rate from hemorrhage from peptic ulcer is less than 3 per cent, which is about the estimated mortality rate on the hospital services in Rochester.

Fatal Gastroduodenal Hemorrhage.—In which locations in the body are ulcers most likely to produce fatal bleeding? There is some evidence, hardly to be considered final, to show that hemorrhage from a gastric ulcer is more likely to result fatally than one which occurs from a duodenal ulcer. Scott,[34] in reviewing thirty-nine cases of fatal hemorrhage, found that in twenty-three the bleeding occurred from duodenal ulcer, in sixteen from gastric ulcers; this is of course not in agreement with the usual ratio of ten duodenal ulcers for each gastric ulcer. Portis and Jaffe's[27] figures, taken from necropsy data, show an even greater discrepancy, twenty-two gastric ulcers and fifteen duodenal ulcers being productive of fatal bleeding. Allen's[1] figures, on the other hand, show a less striking percentage difference in mortality rate; he cited thirteen deaths in a series of ninety-four cases of hemorrhagic duodenal ulcer and six in a series of forty-two cases of bleeding gastric ulcer. Even on the basis of his figures it would appear that serious bleeding occurs more often from gastric lesions than from those located in the duodenum.

All figures on the mortality rate of hemorrhagic ulcer, in whatever location, indicate that the most serious and uncontrollable types of bleeding occur in older individuals. Goldman[17] noted that 70 per cent of all hemorrhages, fatal or nonfatal, occurred in patients past the age of forty years and that there was a definite rise in the mortality rate with advancing age and with each repeated hemorrhage. Allen's[1] figures indicate that the mortality rate from massive hemorrhage in patients past fifty, admitted to the Massachusetts General Hospital, is approximately 33 per cent.

In another paper Allen and Benedict[2] have noted that the average age at which fatal hemorrhage occurs is about fifty-six years. In short, all of the available figures indicate that fatal bleeding is relatively less likely to occur in individuals under the age of forty and is much more common in individuals over fifty. A surprising number of initial hemorrhages are fatal in these older individuals, the usual course being that of rapidly repeated episodes of massive bleeding. These repeated hemorrhages often occur within a short space of time, usually within a period of about seventy-two hours. According to Gordon-Taylor,[18] the first three days of massive bleeding will account for about 40 per cent of the deaths, 25 per cent of which will occur on the third day alone. If there is further loss of blood after the third day the mortality rate, in this author's experience, rises to 78 per cent. This is, in general, about our experience with fatal hemorrhages at the clinic. Table 1 gives the significant data in seven cases of fatal hemorrhagic ulcer recently observed at the clinic; it shows the nature and source of bleeding better than could be done by a lengthy discussion. It may be agreed, therefore, that the most severe grades of hemorrhage from gastric or duodenal lesions occur in older individuals, usually males, following a period of active symptoms of ulcer, and that the commonest pathologic finding is an active inflammatory ulcer, with erosion of an artery, often a sclerotic one, at the base (Fig. 1).

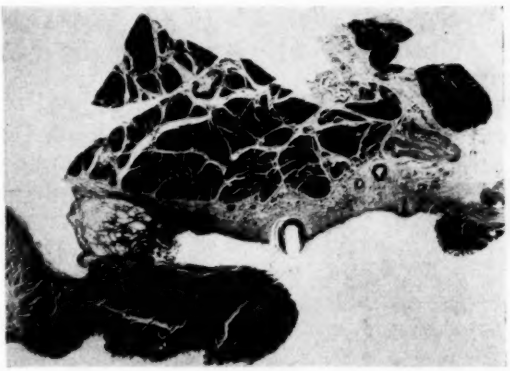

Fig. 1. Erosion of a branch of the pancreaticoduodenal artery in the base of a duodenal ulcer, with fatal hemorrhage (x2½).

Treatment of Acute Hemorrhage

On the basis of the statistics and mortality figures just cited, it is apparent that individualization of the treatment of gastroduodenal hemorrhage is essential and that routine methods of management cannot be outlined for all cases. Minor degrees of bleeding require little in the way of special therapy, rest in bed and a moderate reduction in diet being as a rule sufficient. Profuse hemorrhages raise the additional problems of maintaining blood volume and renal

TABLE I. FATAL HEMORRHAGIC ULCER

Age, years, and sex	First records after admission					Duration of ulcer symptoms, years	Previous operations	Previous hemorrhages	Source of bleeding	Remarks
	Blood pressure, mm. of mercury	Hemoglobin, gm. per 100 c.c.	Red cells, millions per cubic millimeter	Urea, milligrams per 100 c.c.						
34 M	90/60	No record	No record	No record		11	Gastro-enterostomy ten years previously; disconnected 1937.	4	Hemorrhagic gastrojejunitis.	No chronic ulcer found.
34 M	84/50	8.9	2.25	96		2	None	0	Gastric ulcer (5x3 cm.) with open vessel at base.	Persistent bleeding for one week.
55 M	60/?	10.2	3.73	28		18	None	1	Hemorrhagic inflammatory duodenal ulcer (2x1.5 cm.). No open vessels.	Bled persistently one week. Pyloric obstruction on admission.
58 M	70/40	6.2	2.52	58		15	Gastro-enterostomy 1931 and excision of gastrojejunal ulcer 1934. Partial gastrectomy 1937.	0	Ulcer in duodenal stump with erosion of large artery.	Typical ulcer formed with very active inflammatory ulcers. Died fourth day after bleeding began.
62 F	96/60	6.0	2.22			13	None	0	Duodenal ulcer (1.8x2.7 cm.) with open artery at base.	Survived twenty-two days after bleeding began.
60 M	94/40	5.7	3.48	60		15	None	3	Large duodenal ulcer with open artery at base.	Survived fourteen days after bleeding began.
68 M	86/70	17.0	5.0	102		20	None	0	Large (6x10 cm.) serpiginous ulcer in stomach. Perforating duodenal ulcer (1.5x1 cm.) with open artery.	Renal insufficiency and gangrene both legs. Lived ten days after bleeding began.

function, while massive or arterial hemorrhage can hardly be controlled except by a direct surgical attack. Unfortunately, one cannot at the onset of hemorrhage predict with any certainty the degree of bleeding which may eventually be attained. The best plan is to be prepared for serious loss of blood. For this reason each hospital should establish a definite organization and a general plan of management for cases of hemorrhage since such standardization of the methods of approach may result in the saving of lives. The necessity for routine orders covering such matters as the frequent recording of blood pressure, pulse and blood counts is apparent and a blood grouping and estimation of blood urea should be carried out without delay. Apparatus for the administration of fluids subcutaneously or intravenously should be instantly available,

since the circulating fluids of the body may be maintained in this manner until a transfusion can be arranged.

Often the first consideration in cases of active bleeding is the treatment of shock. The foot of the bed should be elevated, the patient should be kept warm, and sedatives (usually morphine) should be administered. Later, pentobarbital sodium (nembutal) or other barbiturates may suffice. The traditional ice bag to the abdomen is probably unimportant. If the patient is in severe shock, infusion of a solution of 6 per cent acacia may be employed as a temporary substitute for blood. The restoration of lost body fluids is obviously important since the loss of fluid in these cases is large, particularly because of the profuse sweating and diarrhea which so commonly accompany hemorrhage; in older individuals the danger of extrarenal azotemia or even renal insufficiency is large. As Noth and Wilbur[26] have noted, fluids are best given subcutaneously, but once active bleeding has ceased, the intravenous route may be employed, particularly if the output of urine falls off markedly and if the blood urea rises. Until such time as fluids can be given by mouth, at least 2 to 3 liters of fluid is a minimal requirement.

Transfusion.—One of the most obvious and important immediate steps to be taken is to provide for a generous number of blood donors from among the patient's relatives and friends, since there are few patients with profuse hemorrhage from ulcer who will not require the administration of blood at some time. The rationale of employing blood transfusion in the treatment of active gastroduodenal hemorrhage has been considered by many writers. One school feels that transfusions should be withheld in order that a rise in blood pressure may not dislodge any newly formed thrombi at the site of hemorrhage; obviously if severe or massive bleeding occurs this need not apply because of the absolute necessity of preventing exsanguination. Most authorities on the subject now believe that the danger of transfusion increasing the rate of blood loss is small and that there are more lives lost by withholding transfusion than by overdoing the administration of blood. In many hospitals, massive transfusions by the drip method are now employed according to the method of Marriott and Kekwick.[21] These authors advocate the administration of blood by continuous venoclysis at a rate that will produce a 10 per cent rise in the concentration of hemoglobin in each four-hour period. Translated into terms of blood administered, this amounts to from 100 to 135 c.c. of blood per hour; 4 or 5 liters, or even more, of blood may be given over a period of forty-eight hours or longer. Such large amounts of blood require a "blood bank," or an unusually generous supply of donors, but they may be lifesaving measures in cases of massive hemorrhage. Not many patients will require these massive transfusions, but there are hardly any individuals who have sustained even a moderately severe loss of blood who will not be greatly helped by the administration of one or several small transfusions (250 to 350 c.c.).

Gastric Lavage.—The use of this procedure to determine the rate of blood loss and to apply coagulants directly to the site of hemorrhage has been both endorsed and decried. It has been suggested that a catheter be introduced into the stomach with the idea of determining whether or not arterial blood is present. If bright blood continues to flow through the catheter one may suspect erosion of a large artery. This is probably a useful point. The administration through the intragastric tube of ice water, epinephrine, and other substances to produce coagulation, is of very doubtful value. Recently, the use of snake venom as a hemostatic has been advised, but no data have been presented to prove its merit. Wangensteen[36] has employed intubation of the stomach with suction attached, chiefly because of the danger of acute perforation in the case of an actively bleeding and inflammatory ulcer; this danger, however, is admittedly small (2 to 3 per cent).

Diet.—How long should food be withheld after a hemorrhage? It was formerly the practice to give nothing by mouth for at least four days or until the stools were free of blood, but this plan of treatment is gradually being abandoned. Meulengracht[22] was the first to suggest the early and liberal administration of food; he claimed a very substantial reduction in the mortality rate as a result of this innovation. His method of procedure is rapidly gaining favor for three reasons: (1) a well-filled stomach, according to Christensen,[14] has considerably less peristaltic activity than an empty one; (2) in the patient with no involvement of a large vessel bleeding is probably self-limited, the adminis-

tration of food, therefore, serving only to hasten convalescence and to take care of any protein depletion or vitamin deficiency which may have existed, and (3) the patient with an open artery is not harmed, since bleeding will continue to occur no matter what is done.

A great many conservative clinicians and gastro-enterologists have been impressed with the Meulengracht treatment and it is now being adopted, with some modifications, in this country. It has been our practice at the clinic to withhold food for from twenty-four to forty-eight hours or until such time as evidence of rapid loss of blood is no longer apparent. After this period, small hourly feedings of ice water, gruel, milk, and sweetened fruit juices are allowed and, if no further bleeding occurs, the patient is allowed to take a generous soft diet in the form of five or six feedings at appropriate intervals on the following day. Alkalis may or may not be administered, depending on whether or not ulcer pain is present.

The Surgical Treatment of Massive Hemorrhage

Any discussion of surgical treatment in relation to bleeding ulcer involves two considerations: (1) the problem of the individual with recurrent hemorrhage, and (2) the matter of surgical intervention in the face of acute bleeding. The first consideration is beyond the scope of this discussion, but it may be said briefly that the age of the patient, the frequency and severity of the hemorrhages, the interval between them and the circumstances associated with each, must be taken into account and that each case represents an individual problem for which no hard and fast rules can be established. The most reliable treatment for repeated and severe hemorrhage from peptic ulcer is partial gastric resection; more conservative measures, such as gastro-enterostomy or pyloroplasty, fall short of the mark and, in fact, even with large resections the protection against hemorrhage is not absolute. Gordon-Taylor's[18] recent paper may be recommended as the best expression of surgical opinion on this debatable subject.

The question of surgical intervention in cases of acute hemorrhage has been well discussed by Balfour[9] in a recent editorial. The objections to a direct surgical attack on the bleeding point under these circumstances are four in number: (1) no actual ulcer may be present, or even if it is, it may not be found; (2) conservative procedures like gastro-enterostomy are inadequate to prevent further loss of blood; (3) the risk of resection, the only relatively certain method of attack, is almost prohibitively high under these circumstances, and (4) if more than three or four days have elapsed since the first hemorrhage, the risk even for simple exploration and ligation of vessels in the vicinity of the ulcer reaches formidable proportions. In favor of surgical intervention it may be said: (1) that there is no other way of controlling the bleeding from an open artery; (2) the mortality rate of conservative medical treatment in cases of severe bleeding, particularly in older individuals, is also extremely high; (3) that if subacute perforation or obstruction are present these can be dealt with surgically, and (4) it is often possible to get patients into very satisfactory condition by the continued use of the drip method of transfusion and the continued transference of large quantities of blood, extensive surgical procedures thus being made possible. We at the clinic have had some recent successful experiences with direct attack on an uncontrollable bleeding ulcer; other workers, including Allen[1] and Gordon-Taylor,[18] have felt that such radical steps are taken too infrequently.

No indications for surgical intervention can be laid down for the treatment in any individual case; suffice it to say that a surgeon should be called in consultation in cases of actively bleeding ulcers and that all preparations should be made for surgical interference in the event that bleeding continues. This requires a high degree of courage and decision on the part of the surgeon as well as careful organization of both the medical and surgical services of the hospital in question and the availability of large amounts of blood for transfusion. Early surgical intervention is much to be preferred once a decision is made as to the probability of arterial bleeding. In fact, there are many surgical authorities who feel that a direct surgical attack on the bleeding ulcer is rarely successful after more than forty-eight hours have elapsed since hemorrhage began.

Summary and Conclusions

The clinical course, mortality rate, complications and treatment of acute gastroduodenal hemorrhage have been considered. The avail-

able evidence indicates that serious bleeding occurs in from 15 to 30 per cent of cases of peptic ulcer and that it is probably responsible for about 30 per cent of all deaths from peptic ulcer. Fatal hemorrhage is chiefly due to the erosion of large and arteriosclerotic vessels in older patients. Under these circumstances the only hope of saving the patient is direct surgical attack on the bleeding lesion. Serious hemorrhage also may arise from relatively insignificant lesions of the stomach and duodenum, some of which may form on the basis of minor inflammatory lesions of the mucosa whereas others may depend on vitamin deficiencies. The treatment of such lesions is preferably conservative.

The Meulengracht method of treatment, that is, a liberalization of diet and early feedings after active hemorrhage has ceased, has many advantages in the management of such cases. The difficulties, of course, are that the nature of the local lesion and the type of bleeding occurring from it cannot be determined with any certainty except in a relatively small group of cases. The duration of the individual hemorrhage, the age factor, the previous history and the availability of proper facilities for maintaining the blood at a point above the level of exsanguination often influence the decision as to the desirability of a direct surgical attack.

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Discussion

DR. P. W. HARRISON, Worthington: I am glad to have the privilege of discussing the very excellent paper just read by Dr. Snell. Hemorrhage of any type is very dramatic and frequently most alarming to the patient and his family, as well as to the physician.

Dr. Snell has shown that the probable incidence of serious bleeding as a complication of peptic ulcer is between 15 and 30 per cent. He has also presented what statistics are available for the Minnesota area, which tend to show that in this region fatal hemorrhage occurs in less than 5 per cent of the cases observed. He has also indicated the general agreement that fatal hemorrhage is chiefly due to the arrosion of large arteries, particularly in sclerotic vessels in older patients.

Goldman reported that at San Francisco Hospital 70 per cent of all hemorrhages from peptic ulcers occurred in patients over forty years of age, and that fatal hemorrhage was rare before the age of forty. He, too, stressed that exsanguination usually was the result of bleeding from a large artery, particularly in the presence of arteriosclerosis.

While each case must be individualized, it would appear that the need for immediate surgical intervention is most likely to be definitely required in this older group with continued or repeated hemorrhages. Sur-

gery in this group of cases is likely to be a very formidable procedure. First, the patient is a bad risk because of lowered resistance from his bleeding. Second, too frequently the only procedure which offers any hope of relieving the situation is a radical removal of the ulcer bearing area at a most unfavorable time, because of the accompanying inflammation and edema. This is particularly true of those ulcers on the posterior wall of the duodenum.

It would appear that the immediate treatment of the majority of cases of bleeding from duodenal or gastric ulcers will be conservative.

The first concern is frequently the treatment of shock. The usual external heat and sedatives are important. If the shock is severe, gum acacia may be used intravenously to support the blood volume. However, I would stress the immediate provision of donors. If the appearance of urgency continues, I believe that either repeated small blood transfusions (125 to 300 c.c.) should be given or after the first one or two transfusions, the drip method of Marriott and Kekwick be instituted. With threatened exsanguination, there of course can be no dispute about the value of transfusion, but even in those hemorrhages of lesser degree, it would seem that more good than harm can be accomplished by slow transfusion, both for the replacement of blood and for any possible hemostatic effect. I believe that the most common error is in expecting too much from one or two small transfusions.

The generally accepted medical treatment of these cases includes starvation for twenty-four to forty-eight hours, or even longer, and then a prolonged period with a greatly restricted diet, accompanied by the use of alkalies.

Meulengracht has introduced the idea of early liberal feeding of finely minced food. He offers a series of 273 cases of pure ulcers and erosion treated for hemorrhage in which early liberal feeding was used and states that the mortality rate has been reduced from an expected 8 to about 1 per cent. He doubts that food has any hemostatic effect, but believes that general exhaustion and the effects of anemia accentuated by starvation, lack of water, salts and vitamins are greatly reduced by feeding.

Boyd and Schlachman of New York have a small series of cases which they feel tends to corroborate Meulengracht's findings. They also present evidence to show that with this regimen there is more prompt relief of subjective symptoms, quicker regeneration of blood and a definite shortening of the period of disability. This work is impressive enough to warrant very serious consideration.

HEART DISEASE IN PREGNANCY*

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WHILE the risk of child-bearing in the cardiac patient has been markedly reduced in recent years, the mortality of pregnancy associated with heart disease is still three times as great as that of uncomplicated pregnancy. There is much reason to believe that this situation is entirely unnecessary and can be markedly improved by intelligent medical management.

The marked increase on the burden of the circulation which occurs in pregnancy has long been recognized.[1, 11, 13] Only recently has the true extent of this been known and the contributory factors demonstrated. Most of these enter into consideration after the fourth month. Naturally prominent among them is the increase in metabolism of about 15 per cent, associated with an increased thyroid activity. The heart rate is elevated fifteen to twenty beats per minute. The venous pressure in the pelvis and legs is definitely increased. The circulating blood volume becomes demonstrably enlarged and there is a gradual increase in the minute volume output, amounting to about 50 per cent at term.[17] This may increase further during labor, but gradually recedes to normal about four weeks post partum. An important factor not generally considered is the development of large new blood channels in the placenta, over which a bruit may be heard. These act similarly to an arteriovenous aneurysm in increasing the heart burden.[1] As a result of these stresses may be explained a definite enlargement of about 10 per cent in the heart size. This appears even larger in the teleoroentgenogram due to the upward displacement of the diaphragm in the later months of pregnancy.

These conditions are continuous burdens on the resting heart. They have been shown to throw their maximum strain on the circulation at about the seventh month, at which time the greatest danger of myocardial embarrassment exists. They are well borne by the normal organ and heart failure does not occur, but where heart disease is present the patient may not be able to retain her compensation or the reserve may be so narrow that seemingly innocuous factors may precipitate its breakdown.

Owing to the fact that about 10 per cent of pregnant women present symptoms or signs which may suggest the presence of heart disease while only about 2 per cent actually have such a disorder,[7] careful study is necessary to distinguish the latter cases. Breathlessness at accustomed tasks, haphazard chest pains, dizziness,

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palpitation, faintness, systolic murmurs, edema, increased heart size, altered heart tones and increased pulmonary markings may all be noted in pregnant women with normal hearts.[7, 8] When due to cardiac disease these will disappear after delivery unless a neurocirculatory asthenia remains to account for some of the symptoms. Significant of heart disease is the presence of more marked cardiac enlargement with characteristic outline changes, diastolic murmurs associated usually with a definite history of a probable etiologic factor, and often some of the other signs and symptoms mentioned.

As is to be expected in the age group considered, rheumatic heart disease predominates markedly, comprising about 95 per cent of all pregnant women with heart trouble.[2] About 2 per cent have congenital heart disease of various types. The remainder are accounted for by the rare cases of hypertensive heart disease, subacute bacterial endocarditis, hyperthyroidism, and the few of indeterminate origin. Of those with rheumatic heart disease the great majority have mitral stenosis, uncomplicated or with aortic valve disease, and a few have aortic valve disease alone.

After the diagnosis of heart disease has been made, the problem of management must be approached. This can be considerably facilitated by employing the functional classification of the American Heart Association as shown in Chart I. Regardless of the anatomic or etiologic diagnosis, this classification will prove of marked value, although it has its limitations. These are illustrated by the fact that the patient may shift from one class to another while under observation, and there are borderline cases where differences of opinion will exist among different observers regarding their class designations.

Of greatest importance in the recognition and treatment of these patients is the prenatal care.[17] About half of them enter pregnancy unaware of the presence of heart disease. Examination in the early months may enable the diagnosis to be made more easily since the rather common symptoms which may be confused with heart trouble do not usually appear at that time. Once diagnosed, proper management and advice will markedly reduce the chances of cardiac embarrassment in the later months of pregnancy when the burden on the heart is much greater. The importance of such care is shown in the observations

CHART I. AMERICAN HEART ASSOCIATION FUNCTIONAL CLASSIFICATION

I. Patients with organic heart disease able to carry on ordinary physical activity without discomfort.
II. Patients with organic heart disease unable to undertake ordinary physical activity without discomfort.
  (a) Activity slightly limited.
  (b) Activity greatly limited.
III. Patients with organic heart disease and with symptoms or signs of heart failure when at rest, unable to undertake any physical activity without discomfort.

of Lamb,[12] who reports a mortality of 20 per cent where the patients were first seen in a decompensated state and 2.2 per cent in the group where compensation was good. Fitzgerald[5] reports no mortality in 192 pregnancies associated with serious heart disease. Scott and Henderson[16] report double the incidence of cardiac failure in charity clinic patients as compared with private patients. The results of all other workers attest to this situation and fully justify the earlier statement to the effect that mortality among pregnant cardiac patients should be little different from the average mortality in pregnancy.

Patients falling in class I and IIa seldom have serious difficulty going through delivery. Nevertheless they are not immune to the precipitating causes of heart failure which may throw them into class IIb or class III, where their management is a very serious matter, and a high mortality exists. This eventuality should never occur with proper handling of the patient who will cooperate. Decompensation rarely occurs without a definitely demonstrable precipitating cause,[1] such as over-exertion, mental overstrain, and infections with their tachycardia and fever. These are important to avoid. Also to be recognized for the increased burden which they put on the heart and for their amenability to treatment are such conditions as anemia, obesity, and dietary deficiencies, especially Vitamin B. If these patients carry through the seventh month, the period during which the circulation is under most severe strain,[11] a normal delivery should be effected without signs of undue cardiac embarrassment. However, extremely cautious prenatal observation and advice for all these women is necessary, since there are no criteria by which the patients who are most likely to have trouble can be selected. Of prime importance to be stressed is the need for frequent observation from early pregnancy. The patient should report every two weeks to the sixth month, and weekly thereafter,

with instructions to inform the physician at any time if undue fatigue, dyspnea, edema, palpitation or cough are experienced. This must be emphasized because when failure appears it is often sudden in its onset. The need for sparing the circulation through adequate rest and avoidance of shopping tours, limitation of stair climbing, and restriction of weight gain are important. The strain of receiving visitors, family illness, household moving, etc., are not to be forgotten. To bed with any intercurrent illness, after calling the physician, is a strict rule. During the seventh and eighth months all activities should be even more limited.

At the periodic examinations keen judgment is sometimes required to ascertain the significance of symptoms which may be given. More definitely indicating the onset of failure are the appearance of basal râles in the lungs, cough, prominent jugular pulsation, liver tenderness, marked weight gain and paroxysmal dyspnea. Effort tests and vital capacity determinations in the latter months may be misleading. Should decompensation appear, absolute bed rest with the usual regime of treatment of heart failure is indicated. As a rule the patients respond well.

Even if no suggestion of myocardial overstrain appears in the class I or IIa patients, they should still be placed in the hospital if possible two weeks before anticipated delivery,[17] or a very strict home care pursued. Labor is usually carried through without difficulty, although forceps delivery, after full cervical dilatation, is indicated if there develops a heart rate greater than 115, or a respiratory rate over twenty-eight.[4] A curve of the latter two observations charted at ten minute intervals during labor will be of value in pointing to the onset of undue myocardial fatigue. A rising curve, especially if associated with dyspnea, may be the forerunner of a severe decompensation. If full dilatation has not occurred, any interference will only aggravate the situation. Morphine must now be used for rest, and the usual treatment of heart failure instituted.

Treatment of class IIb and class III patients is much more difficult for it is among these that almost the entire mortality from heart disease is found. Women whose heart condition has ever justified such classification prior to pregnancy should never become pregnant, and those who enter these groups after becoming pregnant have either been poorly advised or unable for some reason to follow instructions. Patients seen in the first trimester who have previously had decompensation or who enter pregnancy in this state should not be permitted to carry on to delivery,[3] and therapeutic abortion is advised before the fourth month, after the decompensation has been treated in the usual manner. Further pregnancy should be made impossible in these patients.

Class IIb patients seen later than the third month require careful observation, much rest, and medication directed toward supporting the heart. If there is no history of congestive failure and the patient is a multipara, spontaneous delivery usually is effected. If this patient goes into class III the failure is treated, and if successful, cesarean section is justified at term.[10, 15]

Class III patients first seen beyond the third month are treated likewise. Medical treatment of the heart failure is most important. Delivery of this class of patients by any known method carries more than 50 per cent mortality,[4, 9] and operative interference is nearly always fatal. If these patients fail to respond to medical treatment, therefore, their interests are best conserved by letting nature take its course,[12] and permitting spontaneous delivery in bed. Rest periods effected by morphine are indicated in such conditions.[4] It can thus be seen that the serious problems are those brought about by delay in reporting for prenatal care, and are therefore to be considered usually preventable.

The question of sterilization always[4, 17] arises when dealing with class IIb or class III patients, whether first seen in those classes or otherwise. Numerous observers advise it when cesarean section is performed, or later. Many factors,[17] religious, social and economic, must be considered when this problem arises, but in any event further pregnancies should be most emphatically discouraged.

The choice of anesthesia in the cardiac patient will depend on the skill and experience of the anesthetist.[13] Ether is widely used, but ethylene,[1] cyclopropane, and spinal anesthesia are proving quite satisfactory.

The prognosis for the pregnant woman with heart disease is good provided competent medical supervision is followed. The knowledge that rarely does a class IIb or class III patient fail to respond to treatment in the first attack of de-

compensation, and that the deaths are practically always those with heart failure histories, points to the fact that this problem should not be too difficult to handle. Every woman with heart disease is entitled to one or two children[6, 18] provided she has not had a cardiac breakdown, and is economically so situated that the raising of a family is not judged to be too great a burden. However, certain patients should never become pregnant, and, if they do, interruption is justified. This obtains where there is a history of heart failure,[8] presence of auricular fibrillation,[7, 11] signs of serious heart muscle damage in the electrocardiogram, active endocarditis or serious complications as tuberculosis, hypertension or nephritis. To such patients should be stressed the danger of further pregnancies, and contraceptive advice or sterilization may be seriously considered.

It has been definitely shown that the age of the patient is an important factor in the chance of carrying through a normal pregnancy, women over thirty-five years of age displaying a markedly higher death rate.[2] Studies on the remote effect of pregnancy on the heart diseases are extremely difficult and no convincing conclusions have been reported, although those who express an opinion are satisfied that repeated pregnancies tend to reduce the span of life and increase the danger of death from heart failure.[6, 9] It is safe to say that "any patient with organic heart disease should be regarded as a case of potential heart failure, because there is no known formula to tell which cases will go through safely and which will not."[3] Many of these women will carry safely through pregnancy but sustain increased heart damage. Frequently repeated is the opinion that the cardiac patient has an easy delivery. Careful observation does not bear this out. Most important in the matter of prognosis is the fact that it can be greatly determined by the coöperation of the patient and intelligent management by the physician.

Finally, it may well be emphasized that here we are dealing with a problem which often requires a great deal of intelligent thinking and keen judgment. This is most satisfactorily provided where it is possible to have the coöperating observation of the cardiologist and the obstetrician, as it has been repeatedly shown that the best results in handling these situations have been obtained where such coöperation existed.

Summary

1. The nature of the increased load on the heart in pregnancy and its significance when that organ is diseased are discussed.
2. The presence of many signs of heart embarrassment in patients without heart disease is pointed out and the separation of these women from those affected by heart disease is shown to be of importance.
3. The problem of heart disease in pregnancy is chiefly that of the rheumatic heart.
4. Classification of these patients according to the functional classification of the American Heart Association will greatly aid in the management of the individual case.
5. The significance of heart disease in any pregnant woman is determined in great part by the character of the prenatal care, the most important element of treatment.
6. Management of these patients consists primarily in considering each an individual problem. The functional classification aids in determining the measures to be employed.
7. Heart failure in pregnancy is treated in the usual manner. Its effects on the pregnancy vary in seriousness with the therapeutic response of the decompensation.
8. The prognosis of heart disease in pregnancy should be good under proper management with no significant increase in mortality.

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Discussion

DR. E. M. KASPER, Saint Paul: It is altogether fitting that the subject of heart disease and pregnancy should be presented by an internist, for a woman who presents herself with these two conditions should be considered as a case of heart disease complicated by pregnancy and not as pregnancy complicated by heart disease.

As usual, Doctor Borg has very ably presented his subject. Every sentence contains much meat which must be digested, and I believe that all of us should read carefully all that he has said when his article is published.

In this condition, we again find what can be accomplished by adequate prenatal care. The mortality rate which used to be above 10% has now been reduced to nearly 2%. Nevertheless, heart disease still ranks high in the causes of maternal deaths, about fifth, I believe. Nearly 1,000 mothers die each year from this condition in the United States alone!

Because many women do not realize that they have heart disease, a great responsibility falls on the obstetrician to discover its presence. Anyone can diagnose easily cardiac decompensation, but when that occurs it often is too late to be of much help, for at least 50% of these women die. Instead, it is up to the obstetrician who firsts sees this patient to be able to differentiate between a normal and an abnormal heart during pregnancy and so be able to get the abnormal heart under treatment early.

Rarely will a cardiac patient ask our advice as to whether she should get married, and it is not common to have a married woman with cardiac pathology ask whether she should have children. What more commonly happens is that a cardiac patient who is pregnant will want to know if she can carry safely through her pregnancy. Such problems must be very carefully considered and all factors must be weighted before an answer can be given. Close coöperation between patient, obstetrician and cardiologist is necessary in order to come to the correct conclusion.

The heart specialist should share in the care of an obstetrical patient with heart disease throughout pregnancy, labor and the puerperium. It is very hard to generalize, in considering these cases, for every case should be individualized. However, I believe that a woman who has not suffered from decompensation should be able to carry through a pregnancy to or near term. The question of an interruption of pregnancy so often arises but, using the words of Jensen in his excellent book, The Heart of Pregnancy,—"It (abortion) should now rarely be performed, for either a woman should not undertake pregnancy or she should be capable of carrying it through."

Heart failure is the indication for interruption of pregnancy but under no circumstances should interruption, whether early or late, occur when decompensation is present. If failure occurs before the 16th or 18th week, an abortion should be done. If later, it may be deemed advisable to carry the patient until the fetus is viable. Delivery is performed in the manner which is easiest for the mother and child, and at this stage, I prefer cesarean section. However, most cardiac cases are carried to term without trouble developing, but it is during labor that decompensation is most likely to occur. The obstetrician and the cardiologist must both be in constant attention at this time.

If no signs of cardiac embarrassment are encountered, usually routine procedures of labor can be followed, but if symptoms of cardiac trouble develop, the patient must be rested as much as possible, treated medically by the heart specialist and forceps applied after complete dilatation of the cervix is accomplished in order to spare the mother expulsive efforts. Occasionally early in labor, a cesarean section might be done though rarely is this necessary.

Our problem does not stop in the delivery for strict observation should be continued during the puerperium. If any interference has been necessary, there is an increased danger of infection, hemorrhage and shock. When there has been no decompensation, there is no contra-indication to lactation.

I would like to recommend to every one the recently published book by Julius Jensen. He has very thoroughly covered every angle of this subject.

FOREIGN BODIES IN CORNEA: CARE AND COMPLICATIONS

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FOREIGN body in the cornea is the most frequent eye injury encountered. In an analysis of injuries occurring in industry it comprised 60 per cent of all cases. For this reason it should merit most careful consideration.

In examining an eye for injury, it is paramount to have good illumination and proper magnification. This applies to the detection and removal of corneal foreign bodies. Before removing such a foreign body, the cornea should be thoroughly anesthetized. The ideal drug for topical anesthesia should be non-irritating, not drying to corneal epithelium, and should not cause dilatation of the pupil, but at the same time it should give good anesthesia. Cocaine is not a good anesthetic as it causes drying of corneal epithelium and dilatation of the pupil. There are various solutions on the market that most nearly meet the above requirements: butyn, metycaine or nupercaine in two per cent solution, and pantocaine in one-half or one per cent solution. Three to four instillations, allowing a few minute intervals between instillations, usually give sufficient anesthesia. It is only in the highly inflamed eye that more instillations are required.

After good anesthesia has been obtained, the foreign body is removed. The instrument of choice for removing a corneal foreign body is a sterilized sharp spud. This allows clean removal with a minimum of damage to the re-

mainder of corneal tissue. If the foreign body is magnetic, one should use the magnet.

If the foreign body is iron, it is readily disintegrated into the ferric salts which are irritating to corneal tissue. In removing this type of foreign body, it is essential to remove the brownish red pigmentation and the layer of oxidized tissue surrounding the foreign body. This is best accomplished with a corneal burr. One can use an ordinary dental burr with fine markings fitted into a chuck handle, rotating it between thumb and fingers directly over the foreign body crater. It will smooth the edges of the crater, add to the patient's comfort and lessen the dangers of corneal ulcer developing. After using the burr in these and similar cases, less postoperative reaction follows and a definite decrease is noted in the incidence of the infiltrative type of ulcer. These are the cases in which, following removal, the patient returns in a day or two with a red eye and infiltration at the site of the foreign body. This is most frequently due to incompletely removing the slough immediately surrounding the foreign material, and for this reason the use of the burr is recommended.

After the foreign body has been cleanly removed, it is good practice to instill an antiseptic ointment which contains some type of an anesthetic—butyn-bichloride, butyn-metaphen, or metycaine-merthiolate—and apply an eye pad firmly. The patient is advised to leave the pad in place over night. Experience has shown that this type of dressing results in more comfort, less irritation, less manipulation on the part of the patient, and therefore, more prompt healing and fewer complications. When the patient has only one seeing eye, it is not practical to apply the above dressing, in which case instilling the ointment usually suffices. Some oculists advocate in these cases the application of a minute amount of carbolic acid to the denuded area with a sharpened wooden applicator, care being taken to remove all the excessive acid from the applicator to prevent its spreading to the clean cornea. If the eye shows any inflammatory reaction, the pupil is always dilated with homatropine or atropine, depending upon the age of the patient.

TABLE I.

1,069 Cases		Average Elapsed Time from Injury to First Treatment
Total number foreign bodies	1,663	1.96 days
Number uninfected foreign bodies on first examination	1,476	1.37 days
Number foreign bodies with ulcer present on first examination	187	7.00 days
Number ulcers following foreign body removal	27	1.5 days

All corneal wounds should be considered serious until proven otherwise by healing. The danger of any corneal injury is corneal ulcer with a resulting scar, or an extension of the infection to the inner structures of the eye with resulting perforation sometimes necessitating enucleation.

What is the pathogenesis of corneal ulcers following the removal of a superficial foreign body? All foreign material in the cornea should be removed promptly to prevent inflammation, sloughing and ulceration of the surrounding layers of tissue, which represent nature's method of accomplishing removal of foreign bodies if left undisturbed. The material that caused the injury may itself inoculate the cornea directly with bacteria. Ordinarily, however, one has to deal with a secondary invasion of bacteria into the small wound, for the infection is generally caused by bacteria which scarcely ever are found on the foreign bodies that cause the injury, but are found very commonly in the conjunctival sac. For this reason, in all cases where corneal epithelium is broken—as from an abrasion or foreign body—the lacrimal drainage system should be inspected. If the tear sac is infected it should be removed, or if this is impractical, precaution should be taken to render it as free from danger as possible. The puncta

TABLE II. DISTRIBUTION OF FOREIGN BODIES OF THE CORNEA ACCORDING TO OCCUPATION

Occupation	Number Foreign Bodies	Percentage of Total Foreign Bodies (1,663)
Granite	652	39.2
Industry	328	19.8
Hilger, Iron, Pulp, Paper, Diamond, Aluminum		
Farm	143	8.6
Laborer	131	7.9
Student	93	5.6
Railroad	64	3.8
Mechanic	60	3.6
Clerical	41	2.4
Housewife	28	1.7
Miscellaneous	123	7.4
Teachers, Children, Salesmen, etc.		
	1,663	100.0

TABLE III. INCIDENCE OF ULCERS FOLLOWING TREATMENT OF FOREIGN BODIES ACCORDING TO OCCUPATION

Occupation	Number Foreign Bodies	No. Ulcers Following Treatment	Percentage
Granite	652	12	1.8
Industry	328	4	1.2
Farm	143	2	1.3
Laborer	131	1	0.76
Student	93	1	1.07
Railroad	64	2	3.1
Mechanic	60	2	3.3
Clerical	41	1	2.4
Housewife	28	0	0.0
Miscellaneous	123	1	0.81
	1,663	27	
	Average incidence, 1.62%		

in many of these cases may be sealed by actual cautery.

What is the ulcer incidence after removal of corneal foreign bodies, as well as the incidence of ulcers in foreign body cases when first seen with a corneal foreign body present? The following is a review taken from our records over a period of ten years. These foreign bodies were removed either by the late Dr. John J. Gelz, Dr. Joseph B. Gaida, or by myself.

Incidence of Ulcers from Non-perforating Foreign Body Injuries of the Cornea

The number of patients seen with foreign bodies of the cornea in the last ten years has totaled 1,069; the total number of foreign bodies, 1,663. Many of the industrial employees have had repeated injuries.

The average time that these 1,663 foreign bodies were seen after the injury was sustained was 1.96 days.

Twenty-seven or 1.62 per cent of the 1,663 foreign bodies, were accompanied by ulcers following examination and treatment. The surprising factor here is the time elapsing between injury and the time attention was sought, an average of 1.5 days. Of the twenty-seven ulcers eleven were of the infiltrative type and sixteen of the foul type of ulcers.

Of these 1,069 patients, 175, or 16.3 per cent, had a total of 187 ulcers already present when attention was first sought. This gives an incidence of 11.2 per cent in the 1,663 foreign body

TABLE IV. INCIDENCE FROM FOREIGN BODIES ON FIRST EXAMINATION ACCORDING TO OCCUPATION

Occupation	Number Foreign Bodies	Number Ulcers Present	Percentage
Granite	652	42	6.4
Industry	328	23	7.0
Farm	143	42	29.3
Laborer	131	14	10.6
Student	93	21	22.5
Railroad	64	7	10.9
Mechanic	60	7	13.3
Clerical	41	4	9.7
Housewife	28	5	17.8
Miscellaneous	123	21	17.0
	1,663	187	
Average incidence, 11.2%			

cases. Eight of the 175 patients had a total of twenty ulcers in this time period. The average elapsed time before seeking medical attention in the cases where ulcers were found on first examination was exactly seven days, as compared with the average of 1.37 days of group without infection.

There were sixty-five of the infiltrative type, and 122 of the foul type of ulcers seen in these 187 cases. Two of these ulcers perforated, and one finally necessitated an enucleation. One required a Sæmisch incision which also resulted in a total loss of vision.

Twenty-three per cent of the patients that presented themselves with ulcers present at first examination had been seen and treated by someone previously and were referred because of irritated, red eyes. Many of these had the infiltrative type of ulcer resulting from incomplete

removal of the foreign body. They cleared promptly on using the burr and cleansing the foreign body crater.

The striking significance of these tabulations is that the lowest incidence of ulcers is in granite and industrial workers which are compensation cases and are instructed to seek medical aid as soon as an injury occurs. Even in these, many instances are found where fellow workers attempt removal, and only if the eye continues to irritate do they seek medical attention. The incidence is highest in farmers and students where delay in seeking attention is the greatest.

TABLE V. INCIDENCE OF OPACITIES RESULTING IN VISUAL LOSS

Forty-nine opacities in a total of 214 ulcers	22.9%
Forty-nine opacities in a total of 1,663 foreign bodies	2.9%
Three opacities in 27 post-treatment cases	11.1%
Forty-six opacities in 187 pre-treatment cases	24.6%
Three post-treatment opacities in 1,663 foreign bodies	0.18%
Forty-six pre-treatment opacities in 1,663 foreign bodies	2.70%

Opacities reported are only those involving the pupil area and those that resulted in visual loss, which varied from 5 per cent to total loss. These figures bring out that visual loss incidence was greatest in patient having an ulcer present when the patient reported for treatment. Usually a period of three to nine months was allowed to elapse before recording the final loss, as in many instances superficial macula would thin, resulting in improved vision. The total incidence of loss for the entire series as seen in above figures is 2.9 per cent, which is comparatively small.

Conclusions

1. Foreign bodies in the cornea should be treated as surgical emergencies.

2. Ulcer incidence following foreign body injury to the cornea is more frequent in patient having a foreign body present over a period of time.

3. The highest incidence is in farmers and farm workers.

4. The lowest rate is in industrial workers. These patients are required to report early for treatment.

Discussion

DR. E. P. BURCH, Saint Paul: We should consider ourselves deeply indebted to Dr. Wenner for the comprehensive manner in which he has presented this paper on the management of foreign bodies of the cornea. Injuries of the cornea constitute the most common eye emergency that the general practitioner, as well as the ophthalmologist, is called upon to treat. They are as a rule attended by considerable discomfort and their sequelæ may result in considerable loss of vision if improperly treated.

It is not my intention to discuss the routine technical or statistical aspects of Dr. Wenner's paper, but rather to emphasize a few points in regard to the prevention and therapy of complications which may follow lesions due to foreign bodies of the cornea.

It should be remembered that many corneal lesions become infected by the pneumococcus group of organisms which are nearly always present in the lacrymal sac. It is advisable in all foreign body cases to be sure that the tear sac is free from low-grade inflammation, for a retrograde infection from this source is often of considerable virulence and difficult to treat.

Chemical cauterization of the damaged corneal area has been mentioned. The work of Gunderson on the iodine therapy of herpetic lesions of the cornea has conclusively demonstrated the effectiveness of iodine solution as an antiseptic in external infections of the eye.

The strong solution of iodine (U.S.P.) which contains seven per cent iodine and five per cent potassium iodide is extremely well tolerated by the cornea and conjunctiva if immediate neutralization with 4 per cent cocaine is carried out. The combination of iodine and cocaine results in the precipitation of insoluble cocaine iodide.

It has been our routine practice to apply the full strength iodine to all corneæ immediately after removal of foreign bodies, and then to flood the conjunctival sac with a solution of four per cent cocaine. The iodine is applied to the cornea by means of a finely pointed toothpick applicator wound with sterile cotton. This procedure is also employed in many cases of infected ulcer. No harmful effects have been noted and it is felt that the number of infections following trauma has been appreciably diminished. Tincture of iodine has the advantage of being readily available, and if nupercaine ointment is instilled in the conjunctival sac the patient experiences little or no discomfort.

In cases of frank infection it is often desirable to employ a stronger cauterizing agent. For this purpose trichloracetic acid is highly effective. After corneal anesthesia is established, the infected area is touched with a minimum amount of a freshly prepared aqueous solution of trichloracetic acid. Care must be exercised to avoid an excess of the chemical and the cauterization should be carefully confined to the infected area.

It has been noted that uninfected corneal abrasions tend to heal more rapidly when the intraocular tension is lower. To this end, if there be no threat of iritis, a 1 or 2 per cent solution of pilocarpine instilled in the conjunctival sac will bring about more rapid regeneration of the corneal epithelium.

If there is an associated iritis, foreign protein therapy with intravenous triple typhoid injections followed by paracentesis of the anterior chamber, the so-called interference therapy of Brown, will result in an increased concentration of antibodies in the aqueous with beneficial effect upon the inflammatory process. If an extensive ulcer results from trauma despite energetic local and general measures, so that perforation of cornea and panophthalmitis is threatened, a delimiting keratotomy may be considered. Another maneuver which may prove useful in deep uninfected wounds of the cornea is conjunctivoplasty, the cornea being covered by a sliding conjunctival flap to promote healing and prevent kerectasia.

CASE REPORT

TREATMENT OF HEMORRHAGIC RETINITIS WITH THE ANTI-HEMORRHAGIC VITAMIN: PRELIMINARY REPORT

EDWARD P. BURCH, M.D., and JOHN R. MEADE, M.D.

Saint Paul, Minnesota

THE initial report of an anti-hemorrhagic factor in the diet of chicks which protected them against hemorrhagic diatheses was made by Dam[1] in 1935. He termed this factor vitamin K. In 1937 Snell[2] reported the successful use of this substance in the control of hemorrhage in patients suffering from jaundice. His experience led us to believe that vitamin K might be of value in certain types of retinal hemorrhage.

In some cases of retinal hemorrhage none of the usual causes such as hypertension, arteriosclerosis, diabetes, nephritis, the blood dyscrasias, and tuberculous periphlebitis are found after exhaustive clinical and laboratory examinations. This group of unexplained hemorrhages constitutes the so-called idiopathic hemorrhagic retinitis which it was believed might be benefited by treatment with the hemorrhagic factor or factors contained in the fat-soluble substance termed vitamin K. It is our desire to place on record the report of a case of multiple retinal hemorrhages which apparently falls into the idiopathic group and which appears to have shown improvement under vitamin K therapy. The object in reporting the case is to stimulate interest in the treatment of retinal hemorrhages since the present methods of treatment seem deficient in many respects.

Case Report

Mr. A. E., fifty-one years of age, a railroad employe, was first seen on April 29, 1938. He stated that one year previously he had noted blurring of vision in the left eye, together with slight ocular pain. He consulted an oculist, who prescribed a change of lenses and advised removal of some infected teeth. The condition persisted although the glasses were subsequently changed in October, 1937. The vision continued to fail progressively in the left eye and the right eye became involved to a lesser degree in April, 1938.

On April 29, 1938, examination of the eyes revealed them to be normal externally with normal pupillary reactions and extraocular movements. The intraocular tension measured 17 mm. of Hg. in the right eye and 13 mm. of Hg. in the left eye. Without glasses vision was 20/50+2 in the right eye and 2/200 in the left eye. Lenses improved the visual acuity in the right eye to 20/25—2, but vision in the left eye could not be improved by lenses. Ophthalmoscopic examination of the right eye showed the nerve head to be of normal color with well defined neuro-retinal margins and normal physiological cupping. There was slight edema of the macular region and scattered throughout the fundus were a few grayish white areas, which were interpreted to be the relics of previous hemorrhages. A few superficial hemorrhages were noted in the right fundus at this time. The blood vessels appeared to be free from arteriosclerotic changes. In the right eye the disc was normal. The macular region was edematous and definitely elevated. There was a fresh superficial hemorrhage along the inferior temporal vein and also a few scattered hemorrhages throughout the fundus. There were also several grayish white areas similar to those seen in the right eye. The blood vessels showed no arteriosclerotic changes. Hospitalization for study and treatment was advised and on May 4, 1938, the patient entered the Miller Hospital, St. Paul, Minnesota.

On admission the temperature was 98.6, the pulse was 70 and the respirations were 18. The blood pressure was 156/90. The patient's family and past history revealed nothing of importance except that in November, 1937, three infected teeth had been extracted. The inventory by systems failed to elicit any points which had a bearing upon the patient's ocular difficulties. A physical examination was completely negative except for the eye findings, no foci of infection being found in the mouth, sinuses or tonsils.

The laboratory findings were as follows: Red blood cells 4,500,000; Hgb. 80 per cent; white blood cells 7,800. Differential formula: neutrophils 59%; lymphocytes 36%; basophils 1%; eosinophils 2%.

The blood smear showed the red blood cells to be normal in appearance.

The bleeding time was three minutes.

The coagulation time was four minutes.

Urinalysis showed the urine to be alkaline with a specific gravity of 1.019. There was no sugar or albumin present and the microscopic examination was essentially normal.

The Kolmer and Kahn tests were negative.

The Mantoux test was negative.

The excretion of P.S.P. was 60 per cent at the end of two hours.

The blood urea was 19 mgms. per cent.

The patient was put on a regime of calcium gluconate drams I t.i.d. during his stay in the hospital. During the brief period of hospitalization his eyes remained unchanged, and he was discharged on May 6, 1938, to be followed on the outside. Upon leaving the hospital he was advised to continue the calcium therapy and to take pilocarpine sweats at home under the direction of his family doctor.

He was next examined on May 14 and on this visit the fundi appeared unchanged.

On May 27 he was re-examined and the fundi showed no new changes. Vision in the left eye was recorded as ability to count fingers at 2 feet.

It was decided on June 29 to institute treatment with vitamin K and the patient was given a supply of the vitamin and instructed to take one teaspoonful three times a day.

On July 20 the hemorrhages appeared to be absorbing and there were no fresh hemorrhages.

On August 31 the fundi were examined and with the hemorrhages were found to be completely absorbed, with the exception of one small paramacular hemor-

rhage in the left eye which did not appear to be recent. There were scattered areas of hyaline degeneration throughout both fundi which had resulted from previous hemorrhages and there was moderate edema of the left macular region.

The patient was told to continue with the vitamin K therapy and to return in two months. He reported on November 8 and stated that vision in the left eye was improved. Examination with the binocular ophthalmoscope revealed a picture very similar to that described on the previous examination. The right fundus was free from hemorrhages. In the left eye there was a very small faint layer of preretinal blood inferior and temporal to the left macula. There were numerous, scattered, grayish white hyaline-appearing areas in each fundus but no pigment disturbance. Vision with glasses was recorded as 20/30 in the right eye and 14/200 in the left eye.

Comment

Although one is never warranted in drawing conclusions from a single case, it is felt that the patient may possibly have been benefited by the administration of vitamin K. When first seen there was ophthalmoscopic evidence to indicate that in addition to the retinal hemorrhages of recent origin the patient must have at some previous date been subject to bleeding into the superficial layers of the retina. Careful clinical and laboratory examination did not elicit any of the usual causes for the hemorrhagic diathesis. On a regime of calcium therapy, the retinal picture remained essentially unchanged. The improvement which attended the administration of vitamin K was both prompt and striking, and over a five-month period no new hemorrhages have made their appearance. The dosage of 5 c.c. three times a day of vitamin K was purely empirical and further investigation may show that this is neither the optimal nor most efficient dosage to prevent hemorrhages. The authors, actuated by the striking results in this single case, have attempted to treat the hemorrhages of diabetic retinitis along similar lines. To date the few cases which have received this form of treatment appear to have derived little or no benefit from vitamin K therapy. All of the patients so treated were elderly diabetics and all showed marked vascular change in the retinal vessels.

It is hoped that by instituting treatment at an earlier stage in younger individuals whose retinal arterioles are free from organic change that some of the untoward results of retinal hemorrhage may be obviated.

In conclusion, the authors desire to express their appreciation to Mr. James Moore of the Archer-Daniels-Midland Corporation, who made it possible for them to obtain the vitamin K. This particular preparation is an oil extract of hemp which has been tested on chicks for its content of antihemorrhagic factor.

References

1. Dam, H.: The anti-hemorrhagic vitamin of the chick; occurrence and chemical nature. Nature, 135:652-653, (April 27) 1935.
2. Snell, A. M.: Clinical and experimental conditions associated with a deficiency of prothrombin. Proc. Staff Meeting, Mayo Clinic, 13:65-67, (Feb. 2) 1938.

ALCOHOL IN RELATION TO TRAFFIC ACCIDENTS

Richard L. Holcomb, Evanston, Ill. (*Journal A.M.A.*, Sept. 17, 1938), reports the results of a study of the drinking of drivers involved in personal injury accidents and of the drinking of drivers in the general population. The second study served as a control of the first, allowing conclusions to be drawn as to the part alcohol plays in accidents. A total of 270 persons were tested in the first study. Drivers involved in personal injury accidents who accompanied the persons injured to a hospital or drivers who themselves were injured were tested by urinalysis for alcohol. A total of 1,750 persons were tested in the second study. Drivers were chosen at random from an area comparable to that of the first study. A complete testing laboratory, with the Harger "drunkometer," was set up in a trailer, allowing breath tests for alcohol to be made immediately. 1. The highest percentage of drinking drivers occurs in the early morning hours and over the week-end. 2. The largest number of drinking drivers occurs in the early evening and over the week-end. 3. The peak age for drinking drivers is from 25 to 30. 4. Women drink and drive as much as men when the number of women driving at various hours of the day is considered. 5. The percentage of drinking drivers in the general population varies as does the percentage of drinking drivers in the personal injury accident group but falls considerably lower at all times. 6. The percentage or number of drivers involved in personal injury accidents varies as does the percentage or number of drinking drivers. 7. As the blood alcohol content increases, the number of drivers appearing in the personay injury accident group increases out of all proportion over that in the general driving population. 8. As alcohol increases, accidents increase and at a rate somewhat proportionate to the increase in alcohol. 9. Equal percentages of drinking drivers are found in the accident group and in the general population group at a point near 0.5 part of alcohol per thousand parts of blood, indicating that alcohol in that amount is not necessarily a significant cause of accidents. 10. The data gathered in this study confirms a self-evident fact, that alcohol is a major cause of automobile accidents.

GEORGE A. EARL, M.D., *President*
Minnesota State Medical Association

President's Letter

The year 1939 is before us.

We start out, as a medical association, from a splendid vantage point. We have a fine heritage and our scientific standing is unquestioned. This applies not only to our famous personalities, but to the average level of our practitioners. From the standpoint of laws to protect the public health none are more fortunate than we.

We can do no better in the future than to follow the examples of the past. Thus we must stress, first, our mission as practitioners of medicine. We must show that our primary interest is scientific attainment and that we cherish, above all, our close personal patient-doctor relationship together with free choice of physician except for certain unavoidable and natural limitations, and hope to continue it.

Keeping in mind, then, our primary interest as practitioners we are going to begin this year a trial of what has come to be known as the "Indiana Plan." This trial was suggested by our retiring past president, Dr. Adson, and endorsed by my predecessor, Dr. Hayes, and by the Council. According to this plan, one topic, or related group of topics, is to be stressed each month in our public health relations. Dr. O'Brien will discuss it over the radio, it will be emphasized in our regular press releases and in public talks before lay groups.

The subject is to be of seasonal interest if possible, with Pneumonia selected for this first month of January. Coöperation of MINNESOTA MEDICINE and of our societies and membership in general has been enlisted in carrying out this plan. Insofar as it does not interfere with previously arranged programs, county societies will be asked to include a paper on the subject at their regular meetings.

In addition to our scientific pursuits and related public health contacts, we are obliged, these days, to give our attention to Socialized Medicine, so-called. Probably the term "Government Medicine" is more exact since in the minds of many people "Socialized Medicine" refers also to voluntary efforts along insurance lines and not under government control.

The question of Government Medicine is undoubtedly in the foreground of public consciousness. Scarcely a lay magazine feels its pages are complete without an article on it. It is for this reason that an Institute on Socialized Medicine has been proposed. The objective of this institute would be to provide our members with a general review of the effects of government in the care of the sick, both as we know it in this country and as it has been observed in Europe. Besides this presentation of facts, we hope to have an analysis of methods of presentation.

We are happy to announce that we have secured Mr. J. G. Crownhart, Executive Secretary of the State Medical Society of Wisconsin, to give us the facts about government medicine in Europe. Those of us who heard Mr. Crownhart give an address in Duluth recently can vouch for it that his talk alone will be worth the trip to the Institute. Dr. W. A. O'Brien and others will participate in discussions. Every member is invited to attend. The date and place is January 14, 2:30 p. m. at the Saint Paul Hotel Ballroom, Saint Paul, Minnesota.

GEORGE EARL, M.D., *President*
Minnesota State Medical Association.

HISTORY OF MEDICINE IN RAMSEY COUNTY

BY J. M. ARMSTRONG, M.D.

(Continued from December issue)

1854

In the library of the Minnesota State Historical Society is a small octavo pamphlet of eight pages called the *Minnesota Homeopath,* Vol. I, No. 4, January, 1859, published by George Hadfield. It, no doubt, was our first medical journal, if it can so be considered. It contains an article on homeopathy, testimonials, and advertisements of Dr. Hadfield's medicines. No other copy appears to be known and no reference to it is to be found in the Index Catalogue of the Surgeon General's Library. Hadfield's office at that time was on Fourth Street just below the Seven Corners where the Arlington Hotel now is. He left, it is said, about 1860 for Memphis, went thence to Little Rock and after the war to Chicago. In 1869, he settled in Cincinnati and exploited a machine for equalizing the circulation of the blood. No further history of him has come to the notice of the writer. He was a man of no culture and a poor physician.

Three physicians not previously mentioned came to St. Paul in 1854 and remained but a short time, Dr. W. W. Mayo, later of Rochester, Dr. Percival Barton, and Dr. John Lambert, of Saco, Maine. Possibly, the latter did not come till the following year. He was still in St. Paul in September, 1855, as an infant daughter of his died there on September 5, 1855. Dr. Barton remained but a short time and then moved to a farm at Inver Grove, Dakota County. More will be heard of him later. On February 2, 1854, Dr. L. C. Kinney received from the county commissioners the sum of one hundred dollars for the care of some smallpox patients. In the fall, Dr. Frederick Andros moved down from Long Prairie, having been elected to the Legislature. He left for Iowa after the legislative session the following spring.

1855

The year 1855 in St. Paul was an eventful one as far as the medical profession was concerned, as some of the men who later became prominent in the profession arrived during that year. There were some changes in the drug business: Dr. Kinney sold his store to Dr. Morton and Thomas E. Pace, the latter having been Dr. Kinney's clerk. Kinney opened a livery stable, and Wolf and Steever opened the Central Drug Store on Third and Wabasha Streets.

The papers for June 26 state that St. Joseph's Hospital had been opened but a short time, and that ten persons were being cared for there, none of whom was a charity patient. The Christ Church Orphans Home and Hospital was incorporated in March. This organization became the nucleus of what was later to be St. Luke's Hospital. The building it occupied still stands at Nos. 87 and 89 Park Place. On account of the muddy roads in the spring the stage coach overturned while conveying passengers between St. Paul and St. Anthony, and a

Mr. Scott and a Mr. Hoyt of St. Paul were injured. Scott suffered a broken leg and Hoyt's head was cut. They were cared for by Dr. Murphy. At the meeting of the county commissioners on April 16, Dr. Goodrich was allowed a quarter salarly of $200 as health officer, and A. M. Fridly, the sheriff, presented a bill for $500 for boarding, and hanging the Indian Utrazy (variously spelled) who had committed a murder in the city. Dr. Willey presented a bill for $50 for medical services rendered to the same Indian. After due consideration the county commissioners cut the sheriff's bill to $225, and allowed Dr. Willey $30. Inasmuch as the latter's services were pronouncing the man dead, after the sheriff had hanged him, the amount was deemed sufficient. According to eye witnesses of this hanging it was quite a gala event. No gallows were erected and the public, if not invited, was present in large numbers. The man was hanged to the limb of an oak tree that grew where the St. Paul Catholic Orphan Asylum now stands (933 Carroll Avenue), at that time quite a long way from town. Shortly after this event, Willey was appointed city physician by the Board of Health, and Dr. David Day returned from Philadelphia, where he had gone to receive his diploma from the University of Pennsylvania.

There was considerable guarded news about cholera in the papers during the summer, and editorials appeared denying that any St. Paul residents had suffered from the disease. Six new physicians came to St. Paul this year. Franklin R. Smith, whose card appeared in the paper under date of November 21, occupied the residence which had recently been vacated by Dr. Biddle. He gave Ex-Governor Ramsey and Hon. David Cooper as references. On December 1 the cards of Drs. John V. Wren and Jacob Henry Stewart appeared in the papers, together with the announcement of St. Paul's first out-and-out medical quack, Russell Post. Notices of these men appear elsewhere in this sketch. The year 1855 also saw the arrival of Drs. J. C. Merrill, Gustavus Rosenk, John B. Phillips, Rudolph Alberti, and James Dorsey. Dr. A. P. Marsh, who at one time had his office with Dr. Goodrich, and played a small part in the organization of the Minnesota Medical Society, moved from St. Paul, probably to Philadelphia. It was surmised by some that his diploma was stolen or forged. Merrill was a homeopath who later called himself Professor Merrill. He played no part in our medical history. He died in St. Paul. The late Dr. Merrill of Stillwater was his son. Alberti, who was somewhat of a mystery, was either a German Jew or a Pole. Berthier was a French Canadian who remained some years and then went to France or Canada. Alberti, Berthier, and Rosenk were not considered by the regular profession to be reputable practitioners. However, they are of sufficient interest to warrant a brief mention of them. As to Dorsey, no more appears to be known than that he came to St. Paul and inserted his card in the paper. A Dr. James Dorsey received the M.D. degree from the University of Maryland in 1825. Whether or not he is the same man is not known. He probably moved on to a better location. Dr. Phillips was a man of education and culture, but he practiced little or not at all in St. Paul. Most of the other men, with the exception of Rosenk and Post, lived only a short time in the city. The two last named remained for a number of years. Their announcements, therefore, may be quoted in full.

Dr. Post

Pearl Street, South Side, 2nd door west, Baldwin School, St. Paul, would offer his professional services to the public, for the cure of all Chronic Diseases. Examinations made and full descriptions given without previous knowledge of the case or asking any questions.

Practice—Electric and Electro-Magnetism

Dr. G. Rosenk

German Practical Physician

Formerly teacher at the Midwife Academy and District's Physician recommends himself in Surgery, Midwifery, and Dentistry and will cure all external and internal diseases of male as well as female persons so as to let them have a cheaper medical attendance, and will do midwifery to poor women without charge.

1856

Late in the year the first published directory in book form for St. Paul appeared. The classified list of physicians together with the location of their offices is as follows:

Alberti, R., St. Anthony St., corner of Wabashaw.
Berthier, Alfred, Seventh St., near Rosabel.
Bunting, J. C., St. Anthony St., Opp. Presbyterian Church.
Dewey, J. J., St. Paul St., below Somerset.
Goodrich, J. D., Third St., below Robert; house, Fifth St., between Jackson and Robert.
Hadfield, George, Third above Minnesota.
Merrill, J. C., St. Anthony St., above Presbyterian Church.
Miller, W. H. (German), St. Anthony St.
Morton, W. H., Third St., near Robert.
Patterson, M.D., Phoenix Block near Post Office.
Potts, T. R., Robert St. between Fifth and Sixth.
Rosenk, Gustavus, St. Anthony St. near Hill.
Smith, F. R., Main St. near Market.
Stewart, J. H., Phoenix Block near Post Office.
Steele, John, Tenth cor. Cooper.
Wren, J. V., Fort near Snelling House.
Veiden, T. J., Third between Robert and Minnesota.
Willey, Samuel, St. Anthony below American House.

Dr. Brisbine's name appears in the body of the directory but was left out of the classified list. The omission may perhaps be explained by the fact that Brisbine was abroad during the year. It will be seen that the list numbers eighteen names. Kellogg Boulevard above Wabasha was then called St. Anthony Street. Olive Street was then St. Paul Street. Fourth Street above Wabasha was then called Main. The Post Office was on Third Street between Washington and Market, and the Presbyterian Church, on Third and St. Peter, stood on the site now occupied by the Women's City Club. The Phoenix Block was on Third Street near Washington on the south side. West Seventh was then known as Fort Street.

Five new names of physicians appear on this list: Drs. Bunting, Patterson, Steele, Smith and Wren. Bunting came from Philadelphia. He was a brother-in-law of Wolff, the druggist, and died of tuberculosis. Wren was in St. Paul several years. He had been a preacher, it is said, before he was a physician, and he paid more attention to politics than to medicine. He was city physician in 1857-1858 and coroner in 1858-60. During the years 1862-1864 he served in the army and was stationed at Fort Ripley. His portrait may be seen with that of the other city officials of 1857-1858, in the County Auditor's office in the Court House. Patterson was an M.B. by baptism and a dentist by profession. John Steele arrived in the summer of 1855 from Strasburg, Pennsylvania. He was a brother of Franklin Steele and practiced in St. Paul for twenty-eight years before retiring. He died in 1885. Like many of our early physicians he came because of his health. Dr. John Steele Abbott is his grandson. Dr. John A. Vervais also came to St. Paul this same year. Other than being mentioned as on the staff of St. Joseph's Hospital in 1859 and as city physician, he does not appear to have been very active in a medical way. For the most part the French Canadians kept to themselves and mixed but little with the rest of the population. The biographies

of Franklin R. Smith and of a Dr. W. S. Cox who came to St. Paul this year will appear later.

Two other medical men not previously mentioned who were destined to play a prominent part in the future history of medicine in Minnesota, came to St. Paul in 1856. They were classmates at the University of Pennsylvania and arrived on the same steamboat. Both passed the remainder of their lives in St. Paul, and both became president of the Ramsey County Medical Society. They were Drs. Alfred Wharton and Daniel W. Hand. Wharton was a tall aristocratic man, correct in dress, manners, and deportment, quick of perception, very able professionally. Hand was shorter, rather a plodder, and a hard worker. He was interested wholly in his profession and anxious to keep in touch with every new development in the science of medicine. Wharton had money, while Hand had none. Wharton made money both in his profession and out of it. Hand finally accumulated money in his profession but worked very hard for it. Hand did everything that was thrust upon him which was for the good of the profession or for the public. He gave much of his time to teaching, to serving as a member of the State Board of Health and the State Board of Medical Examiners, and to other duties which brought him little, if any, financial return. Wharton shirked no responsibility but sought none. He retired from practice in 1885, living until 1920 and looking twenty years younger than his age until shortly before his death. Hand aged rapidly, became very deaf, and practiced till the last.

Dr. Wharton related to the writer the following incident which occurred one Sunday afternoon shortly after the two men arrived in St. Paul. They went for a walk toward the outskirts of the city, and Hand remarked that he wished he had brought along a skull from Pennsylvania. He had not been able to find room for one in his baggage. After walking for a time they reached a spot near the present corner of College Avenue and St. Peter Street, then the northern boundary of the city. There was a spring there, and that with a heavy rain had washed out a gully in the side of the hill and exposed a coffin. They went back after dark and Hand got the skull. In later times when the houses on the east side of St. Peter Street were built, other coffins were found. This was the site of the Catholic Cemetery from 1849 to 1854 (bounded by Summit, Wabasha, College, and St. Peter). Previous to this time the cemetery was on Bench Street north of the old log chapel of St. Paul from which the city takes its name. Skeletons were dug up on this latter site also in later times when the Stees block and the present *Dispatch-Pioneer Press* building were erected. When the present Federal Farm Loan Bank building was built (about 1911) a skeleton was unearthed under the sidewalk on the north side of Fourth Street. The workmen left it there. The present Calvary Cemetery was preceded by another one on the site now occupied by St. Joseph's Academy and northward. When the writer was a boy, he saw some skeletons unearthed during the installation of either sewer or water pipes on Iglehart Street between Farrington and Western Avenues. In the autumn of 1930 when an addition was being built to the Academy building, some coffins were unearthed during the excavation for the foundation.

Another medical man came to St. Paul during this year, who, though he never practiced medicine, was a man of charming manners and was well known to the early settlers. He had practiced or attempted to practice in Chicago, but became associated upon his arrival here with the Zimmerman photographic galleries and made his living painting miniatures, one of which, to the writer's knowledge, is very well done. He died in St. Paul about 1882. He was a graduate of the University of Copenhagen in 1850. A pair of obstetrical forceps in a buckskin bag and some woolen obstetrical tape which belonged to him, also some of

his manuscript lecture notes, are in the museum of the Ramsey County Medical Society. The forceps are, without doubt, one of the most beautiful examples of polished, hand forged steel ever seen. His name was A. Falkinschield.

1857

This was the year of the financial panic. For three years there had been an unbridled speculation in real estate, and land had been in such a demand that investors, buying and selling on a rising market, were able to make a profit, even though they must borrow money at three per cent or more per month. Every boat coming up the river brought in scores of immigrants, speculators, and many others looking for easy money. St. Paul was known as the liveliest and toughest town on the river, a place where thefts and even murders were common.

In 1857, the bubble burst. Hard money disappeared and currency issued by banks became worthless, since its value was based upon speculative land values. Even money issued by the county, the city, and the state, was valued at only forty cents on the dollar. The entire population was affected. To keep people from starvation, the city projected public improvements, paying for the labor in scrip. In the meantime a vigilance committee was organized, and the rowdy element was forced to leave town. Notwithstanding these hard times, three new physicians came to town. The card of Dr. H. Wedelstaedt, homeopathist, appeared in the *Pioneer* and *Democrat* on November 15. He gave Dr. Hadfield and Dr. Pulto of Cincinnati as references. He remained in St. Paul the rest of his life and was very well known there. Dr. Sylvester J. Sawyer inserted his card in the paper of October 15. He stated that he was "late Surgeon to Bellview Hospital, New York City." He left a year or so before the Civil war. While in St. Paul he married Helen Hastings, halfbreed daughter of one of the early settlers. Dr. J. H. Studdeford's card appeared in the paper on October 16. He claimed to be late house surgeon to the Blackwell's Island Hospital, New York. Apparently he remained but a few months as no other information about him is available. In April, 1857, Samuel Medary arrived. He had been appointed Territorial Governor of Minnesota. With him as his secretary came Dr. Thomas Edwin Massey of Columbus, Ohio.

Massey had formerly been a resident of Hot Springs, Virginia, and had graduated from the University of Pennsylvania in 1846. For some years prior to his arrival in Minnesota he divided his attention between medicine and journalism, and became the editor of the *Ohio Statesman.* An article written by him on the subject of the inflammation of the female genital organs was published in the first number of the *Ohio Medical and Surgical Journal* (September, 1848). During his period of residence in St. Paul his practice of medicine was subordinated to other interests. In January, 1862, he started a newspaper called the *St. Paul Journal* (weekly), but the paper did not flourish, due to the fact that its political affiliations were with the anti-war Democrats, and publication was suspended at the end of eight months. Dr. Massey presented an early form of stethoscope to Dr. C. E. Smith, Sr. It closely approaches in design the original wooden stethoscope pictured in the second edition of Laennec. Massey lived in St. Paul until about 1863, when he returned to Ohio. Of his later activities little is known. He moved during the following decade to Colorado, where he probably continued his interest in journalism and in medicine. In 1874, he published in Denver a small pamphlet entitled the "Relations of Colorado to Pulmonary Consumption." The following year an article by him appeared in the Transactions of the Colorado Territorial Medical Society. The paper was one which he had read before the society in 1873. It is stated that he went from Colorado to Washington (state?).

(To be continued in February issue.)

EDITORIAL

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BUSINESS MANAGER
J. R. BRUCE

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EXTENSION OF GOVERNMENT MEDICAL ACTIVITIES

THE present Congress is doubtless going to be called upon to appropriate huge sums for increasing government health activities on a national scale. Although the Interdepartmental Committee in its report last July favored compulsory sickness insurance as a government activity but did not recommend it at the time presumably on account of the billions of dollars involved, the committee did approve legislation to extend in various ways government health activities, which it is estimated will amount to 485 million dollars a year.

The medical profession as a whole sees no need for expenditures on such a scale, and its members as citizens and taxpayers know that the federal government with an annual deficit of several billions of dollars could not afford such appropriations if they were needed. This attitude may seem inconceivable to the theorists who are directing government activities in Washington with a total disregard for adjusting expenditures and income.

If the medical profession of this country is convinced that the extension of government in medical activities leading more and more towards state medicine resembling that established in Europe is undesirable, it should take a militant stand on these proposals as they appear in Congress by letting representatives know, in no uncertain terms, its convictions.

And, if any physician has no convictions as to the comparative values of medical care as furnished by so-called private practice as typified by medical practice in this country, and medical care as furnished by government sickness insurance in Europe, let him read the report* by the secretary of the Wisconsin State Medical Association of the operation of state medicine in England, France, Germany, Denmark, Norway, and Sweden.

A student of social problems, and particularly those associated with medical practice, Crownhart was well prepared to undertake this investigation. Convinced that conflicting reports of the operation of sickness insurance in Europe can be explained on the basis of restricted viewpoint, Crownhart studied the systems in the countries mentioned from the standpoint of the insurance administrators, the labor organizations, the farmers, the hospitals, the physicians and the insured individuals. The picture he paints is of a medical service falling far short of the goal aimed at by the proponents of socialized medicine, limited in its social service by inadequate insurance funds and necessitating a huge administrative personnel. Inseparably associated with compensation for loss of wages, the sums involved are enormous.

*Crownhart, J. G.: Sickness insurance in Europe. Price, $1.00. State Medical Society of Wisconsin, Madison, Wisconsin.

The question of the enactment of legislation approaching state medicine is a live one. Proponents of change in medical practice are most energetic. The article entitled "A.M.A." in the November *Fortune* was doubtless written largely in a provocative mood. The one entitled "Rehearsal for State Medicine" in the *Saturday Evening Post* for December 17 is an illustration of how medical practice can be changed by a governmental agency when someone in authority thinks there is need.

What should the attitude of the medical profession be? Certainly we should voice our conviction that panel system medicine is inferior medical care. The emergency care provided for 77,000 Farm Security Administration clients in North and South Dakota and elsewhere may be necessary to maintain medical care in localities unable to support doctors, but such a system is supported by taxpayers elsewhere and is not therefore generally applicable.

It must be remembered that proposals to apply a changed system of medicine to those with an income of $1,500 a year or less, is going to affect 90 per cent of the population and those with $3,000 a year or less some 97 per cent.

As Crownhart concludes, each state must study its own medical needs and decide whether the sickness insurance in Europe which falls far short of ideal medical care, is wanted.

The real need for financial assistance in meeting the cost of sickness is not for the payment of an occasional visit from the general practitioner. Although the total of this item is a large sum it is so widely spread that it does not present a hardship to the individual patient. The item that requires the financial assistance readily furnished by insurance, is the cost of an acute illness requiring in most instances hospital care and services of specialists and nurses or of a prolonged illness involving loss of income. The hospital associations are meeting part of this liability by insurance methods and there is reason to believe that cash indemnity or similar policies issued by commercial insurance companies or by non-profit mutual organizations, can meet such a need on a much larger scale than they do at present. We shall watch with interest the working out of experiments along this line recently inaugurated in California and Wisconsin. The response of the public to insurance against hospital bills, suggests the likelihood of a similar reception of insurance against other costs incidental to hospitalization.

It is difficult for the average layman to grasp the facts here brought out. It would be well for members of the profession to explain to their patients that it is to the advantage of public and profession to avoid extension of medical service supplied by government agencies. Our representatives in Washington wish to know what their constituents think on the subject.

THE MEGAKARYOCYTE

SYMMERS[5] has recently reiterated a statement he articled first in 1917,[6] bearing upon the relationship of Hodgkins' disease with the megakaryocytes of the bone marrow. W. B. Castle[1] lecturing before the Victorian Branch of the British Medical Society in Australia is reported in the letter to the A.M.A. as stating "Hodgkins disease is a megakaryocyte Tumor."

This is a challenging statement. Medlar[3] appears to have had the same concept and called Hodgkins a metastasizing tumor—a "megakaryocytoblastoma." Bunting and Minot both discovered megakaryocytes in the small blood vessels of lymph glands in patients with Hodgkins disease. This is a field in which opinions have arisen chiefly through cytological study and morphological resemblance. All observers must agree that they are looking at cells more or less distorted in processing and staining. At the same time the method has been highly productive and has greatly advanced knowledge. Nevertheless the megakaryocyte (and their exclusive marrow origin seems to be accepted) has not been as easy to study as early erythropoietic or leukopoietic forms.

We should recall that the thrombocyte is a sticky blood traveler and it is his business to agglomerate where exposures occur and barriers are broken—hence the "white clot." The parent megakaryocytes are likewise subject to easy distortion. Liniarzi[2] and his associates at the University of Illinois have recently offered a technic to obviate some of this distortion. The needled sternal marrow is handled in paraffine lined tubes and pipettes and centrifuged at high speed to send the adult red cells to the bottom of the Wintrobe tube and leave the serum and early leukocyte and platelet precursors juxtaposed in the midportion. From a mixture of these,

smears are made of surpassing excellence. Ponderous systems on hematology have not given much satisfaction to the clinician already weighed down by the burden of voluminous terminology and endless repetition. Neither do we profit especially by reference to encyclopedic summaries that aim to leave out mention of no one in any land who ever ventured to express an opinion or submit an observation.

It is necessary to have accurate data concerning the thrombocytes in all essential and secondary depression of the megakaryocyte sequence. Otherwise, splenectomy will be ventured where entirely contraindicated as, for example, in toxic purpura, concealed poisoning, or even in aleukemic leukosis. Rhoads and Miller[4] have recently published data on four different groups of marrow in so-called "aplastic anemia." All were anemic but the marrow varied from true aplasia through grades of hyperplasia with retention of marrow products, and group 4 which is a megakaryocytic replacement of other elements and is comparable to the anemia of the leukoses. Hodgkins continues to be a great puzzle; but whether megakaryocyte studies shall help to advance its therapy or not, there is a wealth of clinical interest centered in the factor of physiologic repression exerted upon the bone marrow by the spleen. This is best exemplified in essential thrombocytopenia where splenectomy cures.

Limarzo's technic promises to give diagnostic assurance in this field as well as in the dubious and uncertain "aplastics" where diagnoses are beset with many pitfalls and uncertainties.

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PNEUMONIA IN MINNESOTA

THE selection of pneumonia as the subject for emphasis in the month of January is particularly timely, for it is in the winter months that pneumonia is most prevalent in Minnesota. Although pneumonia in Minnesota is not as prevalent nor as serious a disease as in certain other states, we do lose from 1,600 to 2,600 citizens yearly from pneumonia of all forms. We have probably three or four times as many cases as this in the state each year and this winter promises to have an increase over recent years.

About half the reported deaths from pneumonia are lobar in type. Inasmuch as it has come to be more generally recognized that an appreciable percentage of broncho-pneumonia is caused by the pneumococcus, several thousand individuals in the state each year are potential candidates for pneumonia serum.

Minnesota has joined several of the eastern states, notably New York and Massachusetts, in a campaign to fight pneumonia. Two years ago facilities were first offered by the State Board of Health for typing the pneumococci and limited amounts of anti-pneumococcic serum for Types I and II were made available to those unable to afford this valuable adjunct in the treatment of the disease.

The value of specific serum in the treatment of the corresponding types of pneumococcic pneumonia having been well established, it behooves every physician likely to be called to see a patient suffering from this disease to be prepared to take advantage of the oppoutunities for typing and the procuring of free serum, if the patient cannot afford it.

If a sputum outfit put out by the State Board of Health is not available, a small but wide necked bottle may be used to collect the sputum, which must be that coughed up from the bronchial tubes and should be at least 5 c.c. in amount. In the case of children, when sputum so often cannot be raised, the child should be placed with the affected side up and induced to cough by tickling the pharynx with a sterile swab from a diphtheria culture outfit and the raised sputum colected from the throat by means of the swab. In order to keep the swab moist during transit, the swab is then pushed into the medium in the diptheria culture tube, not simply rubbed on the surface of the medium.

The sputum specimen is then mailed or sent (whichever is quicker) to:

Main Laboratories, Division of Preventable Diseases,
University Campus, Minneapolis, Minnesota
Duluth and St. Louis County Branch Laboratory
228 New Jersey Building, Duluth, Minnesota
Rural Health District No. 1
City Hall, Bemidji, Minnesota
Rural Health District No. 2
Court House, Mankato, Minnesota
Rural Health District No. 3
City Hall, Rochester, Minnesota

A telephonic or telegraphic report will be sent by the laboratory as soon as possible if typing is successful and therapeutic serum is available, or if time permits the submission of another specimen.

The various laboratories may be reached after hours or on Sundays and holidays as follows:

Main Laboratories, University Campus—Call University of Minnesota telephone operator and ask for Pneumonia Typing Service.
Branch Laboratory, Duluth—Call Hemlock 907 or Hemlock 5040-W.
Health District No. 1, Bemidji—Call District Health Officer.
Health District No. 2, Mankato—Call District Health Officer.
Health District No. 3, Rochester—Call District Health Officer.

Although the funds available for the purchase of serum are limited, as long as it lasts type sera other than types I and II will be furnished direct from the Main Laboratories, Division of Preventable Diseases, State Department of Health, University Campus, Minneapolis, as follows: III, IV, V, VI, VII, VIII, XII, XIV, XVII, XVIII, XIX, XXVIII and XXIX. In addition type sera XIII, XV and XVI will be secured air mail by Main Laboratories when typing is carried out early enough to obtain the serum in time for use. Serum thus ordered should reach Minneapolis inside of twenty-four hours.

It is generally conceded that after four days have elapsed from the onset of symptoms of pneumonia, serum is not likely to be of benefit. Fast action is therefore essential.

As valuable articles on the subject of pneumonia in Minnesota, we recommend those by Drs. Heathman, McDaniel and Chesley which appeared in this journal for January and December, 1937. An authoritative booklet on serum treatment is one entitled "Pneumonia and Serum Therapy" by Frederick T. Lord and Roderick Heffron, published by the Commonweath Fund, New York.

In Memoriam

Gustave Adolph Christensen

1864-1938

DR. Gustave Adolph Christensen, a pioneer physician at Cass Lake, died at his home October 9, 1938, at the age of seventy-four. He had practiced in Cass Lake since 1901 when he left Granite Falls.

Dr. Christensen was born in Chicago on March 2, 1864, the son of Rev. Emil and Amelia Christensen, pioneer missionaries who established the first Lutheran mission post in Oregon. He was sent to boarding school and received his medical education in Indianapolis, Indiana. In 1888 he was married to Delia Thykeson of Albert Lea, Minnesota, and from this union seven children were born, five of whom survive.

Records fail to show what medical school was attended by Dr. Christensen. He was never a member of the Minnesota State Medical Association.

Frederick A. Stevens

1860-1938

DR. Frederick A. Stevens, a resident of Lake Elmo for more than fifty years, died during the night of November 28, 1938, at the age of seventy-eight.

Frederick Stevens was born October 28, 1860, at Mantorville, Minnesota, the son of Edwin A. Stevens who was at one time a member of the editorial staff of the *Pioneer Press,* Saint Paul. Dr. Stevens graduated from the Central High school in Saint Paul. After finishing sophomore year at the University of Minnesota, he graduated from the Hahnemann Medical College, Chicago, in 1883, and the same year was licensed in Minnesota.

After spending two years doing postgraduate work at the New York Ophthalmic Institute, the College of Physicians and at the Bellevue Hospital, Dr. Stevens located at Lake Elmo in 1887. His early surgical work was done in homes in or close to Lake Elmo until the Lake Elmo Sanatorium was built. When this proved too small, he transferred his patients to Bethesda Hospital in Saint Paul.

Dr. Stevens joined the Ramsey County Medical Society September 29, 1913, and was a member of the Minnesota State and American Medical Associations. He was married January 14, 1914, to Gertrude Londigan, who with their daughters, Kathryn, Gertrude and Marian, survive.

Dr. Stevens was a hard worker, a genial companion, a generous entertainer and had the faculty of endearing himself to his patients who always became and stayed his friends.

He will be greatly missed in the community where he lived and worked so long and for which he did so much.

E. SYDNEY BOLEYN.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
W. F. Braasch, M.D., Chairman

REHEARSAL IN MINNESOTA

In the wake of the widely read *Saturday Evening Post* article entitled "Rehearsal for State Medicine," four officials of the Farm Security Administration presented themselves before the Council of the Minnesota State Medical Association, December 15, in Saint Paul.

These officials confirmed the astonishing extent of various types of medical services for Farm Security Clients described in the article —declared that in each case the plan employed had been worked out by the local county or state medical society—asked the Council to work out some similar plan for care of the farm families of Minnesota who are now receiving loans from the Farm Security Administration.

Problems of Lower Third

Said Spokesman Dr. H. V. Meriwether, United States Public Health Service:

Many farm families in the lower third of farm brackets are in need of medical and dental care.

The Federal Farm Security Administration is trying to rehabilitate these families by loans and by consultation to revise their farming methods and living habits so that they will be able to make a living on their farms and also payments on their loans.

About 80 per cent of these families are making their payments as scheduled. Where they fail we find medical and dental problems in every case. Clearly we cannot continue our program successfully without provision for medical service for these farmers and we have come here today to ask the Minnesota State Medical Association to devise a plan for caring for our families in Minnesota.

Plans Vary

Already there are thirty-two different plans in operation in thirty-two different states. The plans vary because the medical societies, in each case, dictated the plans. In general, there are two different types of arrangement—individual arrangements and "pool," "insurance" or "cash indemnity" plans.

In Ohio, with the individual plan, the list of doctors who wish to participate goes to the farm clients. The client selects his doctor and he and the doctor get together to decide what the client will need for the year. The Farm Security Administration provides the funds.

In Logan County, Ohio, all of the money is put in the hands of the Logan County Medical Society. The custodian of funds for the society pays the doctors' fees according to a prearranged schedule until the money runs out. From then on it is between doctor and patient. The doctor must continue in attendance until the end of the year, however, no matter how the funds hold out.

72 Per Cent of Normal Fees

In the "pool" or common fund plan, the farm client pays a definite sum each year. In the South it is usually $12; in the Northwest $20 to $30. Each client is issued a card with a number and he may call anybody in the medical society to take care of him. The doctor submits his normal fee at the end of the month. If there is enough money to warrant it he is paid 100 per cent of his bill. If not, the amount paid is pro-rated down to whatever the fund can pay. On the average, about 72 per cent of normal fees have been paid in all counties to date. If any money remains after fees are paid, it is held to the end of the year and pro-rated, then, to the doctors.

In County Society Hands

In several counties in Iowa the doctor submits to the county society only an account of services; the county society sets the amount. In any case, the entire matter remains within the county medical society.

And I personally believe that all of these matters should remain in county medical society hands.

Rehabilitating Doctors

North and South Dakota have presented a separate problem. The doctors, as well as the patients, needed rehabilitation if the doctors were to remain in practice there.

The plan in operation was suggested by the doctors. It has been changed three times and the money appropriated has been increased three times.

Last year 92 per cent of the medical bills were paid on a 66 per cent basis for the 67,000 relief load. The question is: shall we shift to a loan instead of a relief basis? Already some 8,000 families are on a loan basis and gradually we may shift entirely to the loan set-up. Payment of medical bills will continue to be on a 66 per cent basis.

The doctors themselves believe they are going to work out something in Dakota that may ultimately be of benefit to all medical societies.

Hospitalization Also

We are working in Dakota toward a group hospitalization plan to take care of all low income families. In Logan county, also, we are making arrangements to take care of hospitalization for our clients on a group hospitalization plan.

We have found in some communities that as many as 38 per cent of adults need restoration of teeth. We are working with the dental societies now, to see how this type of dental work can be done.

For young people we try to provide glasses. For older people we are willing to relinquish a portion of the milk income to permit them to buy glasses.

8,000 in Minnesota

In Minnesota we ask that the state medical association work out the broad plan for care of our Minnesota clients. The county societies can work out the details. There are approximately 8,000 farm families receiving loans from the administration now in this state. About 75 per cent of these families are in the northern part of the state, about 25 per cent in the South. In the North and the West there are from 125 to 150 families in a county. A local superintendent makes investigations for eligibility for loans with the advice of the local banker and others and sets up the individual budget and plan for each family. In most of these cases, the trouble is not lack of income, alone, but lack of proper management of the farm and the home.

Personally, I like the Iowa plan by which the county medical society receives the money, pro-rates it to members and disciplines its own members.

As to Chiselling

The problem of chiselling, so-called, can best be handled so far as the doctors are concerned by their own medical societies. So far as the clients go, we have found that use of the service starts high. Apparently the people want to see if the service is really available as promised. In three months the calls are usually down to normal. In the case of real chisellers the superintendent makes a trip to see the client. It is ordinarily unnecessary for him to call twice.

We suggest that you formulate a plan, first, for the heavy load counties. If the plan works, expand it next year to other counties or change it as you see fit.

* * *

The whole matter was referred for action to the Committee on Low Income and Indigent Problems of which Dr. W. A. Coventry of Duluth is chairman.

Appropriation Endorsed

Dr. A. J. Chesley, secretary and executive officer of the State Department of Health, presented the budget of the Board for 1939, asked the special endorsement of the Council for $20,000 appropriation for purchase of pneumonia serum and also for a $12,000 appropriation for an industrial hygiene program, at the same Council meeting.

He explained that pneumonia serum is now supplied through a special appropriation from the Surgeon General of the United States Public Health Service and will not be available next year.

The Council endorsed the work of the Board in general and particularly its request for these appropriations.

MEDICAL YARDSTICK

There is only one basis for argument in any discussion of methods and payment for medical care. That is: will the resulting service to the patient be in line with the best standards of medical practice?

An excellent yardstick for good medical service has been provided by Mr. J. G. Crownhart, secretary of the Wisconsin State Medical Society, as a result of his own experience in medical organization work in Wisconsin and also of his recent careful survey of medical services in European countries. It is safe to say that any service which could be shown on the basis of experience—not of hopeful thinking—to measure up to this standard could be endorsed by the doctors. The yardstick follows:

Personalized Service

1. Responsibility for the service must be direct to the patient.
2. There must be a recognition of the fact that illness cannot be scheduled and that the physician must have time to do his work.
3. The needs of the individual sick man must govern the service.
4. Service to the patient must be a personalized service.

A fifth stipulation might be added to the effect that the physician must have ample opportunity and incentive for postgraduate study and research.

Obstacles

If it were possible for compulsory government medicine to measure up to this standard in fact, no conscientious physician could object to it. Experience in Europe, familiarity with bureaucracy in America have shown conclusively that systematized government medicine cannot possibly provide a service that measures up to the standard. Even if every government official connected with the service were invariably honest, conscientious and thoroughly qualified for his work, still there would be insuperable physical obstacles in the way that would prevent a personalized service in which the physician had sufficient time to do his work and in which the needs of the sick man alone governed the service.

Some other solution must be found for medical care in the United States.

PUBLIC HEALTH—Dr. Emerson

The following paragraphs from a recent address made in Michigan by Dr. Haven Emerson on "Public Health and Preventive Medicine" are highly pertinent to current discussions of medical care and its possible extensions. Their importance is emphasized by the fact that they come from a public health official and teacher rather than from a typical representative of the private practitioner of medicine.

Says Dr. Emerson:

Health is much more than the freedom or recovery from disease. It is a way of life, a balance, a compromise, sometimes worth sacrificing other desires or ambitions to achieve, and the most precious possession a person may lose or feel compelled to give up in exchange for other ambitions. Health is a quality of man the individual, not of that amorphous, helpless, blundering social entity, the Public.

There are but six functions which modern civil government has found appropriate and necessary for a department of health. Whatever nation, state, city or rural area has created a department of health to be devoted to the application of the science of preventive medicine for social ends, it has found that vital statistics, communicable disease control, the hygiene of maternity, infancy and childhood, laboratory service, sanitation, and health education include all essential public health services. These are all auxiliary or supplementary activities, the benefit of which comes to the client or patient of the private practitioner.

Each of these funtions of a public health department is necessary to make more effective, not to supplant, the work of the family physician.

For the hygiene of maternity, infancy and the child, if we had a consistently educated community of families, there would be no need for concern of the health officer with such matters.

Certainly no public officer, elected or appointed, can be presumed to have such interest or responsibility for the health of the expectant mother as she herself and her husband should have, and should know enough to ask for from their physician.

It ought to be as much taken for granted to call upon a physician to learn how to keep a baby or its mother well as to ask him to the home to diagnose a fever or set a broken bone.

The health officer of a community is its hired teacher, obliged to advertise to the public the benefits to be expected from using the local practitioner as an expert in normal childhood, as well as calling on him for medicines or operations.

It ought to be the medical practitioners, familiar as they are with the needs for health teaching and service among their patients, who should formulate the substance and sequence of the public educational program, and press upon the health officer to do more and better teaching, and teaching that will bring about personal health of multitudes.—*Journal of the Michigan State Medical Society.*

SAFETY CONFERENCE—DULUTH

Once each year for fifteen years the St. Louis County Medical Society has taken charge of one of the five annual Industrial Conferences staged annually by the Duluth Chamber of Commerce.

Representatives from ninety-seven different industries and business firms attend this conference and the program on industrial medicine arranged by the physicians is a high point in the year's safety program.

Medical head-liner this year was Dr. George Earl, president of the Minnesota State Medical Association, who talked to an audience of 1,000 industrial workers and safety leaders at the Hotel Duluth on the subject "Social Medicine."

"Dismiss from your minds" Dr. Earl told them, "the idea that the doctors have any prejudice against the state caring for those who cannot care for themselves.

"There is now socialized medicine, if you wish to call it that, to the extent that more hospital beds in the state are maintained by government than are maintained by private sources *but the movement to socialized medical care for all does not spring from democratic sources.* Often it is associated with totalitarian government philosophies as a part of their program to extend administrative power."

CAN A DREAM BECOME A REALITY?

(Monthly Editorial Prepared by the Medical Advisory Committee)

Several years ago three members of our Association sat in a room and pondered their obligations toward the new baby that they had taken upon themselves to nurture and rear, little knowing the immense task, the wellnigh insurmountable difficulties that were before them, but with the hope that as time passed their duties would be made clear to them. These duties have now become a pleasure and a happiness because the dream of yesterday has become a reality of today.

Your Medical Advisory Committee, as the New Year dawns, finds itself working whole heartedly with the insurance companies that protect and indemnify our members. It has an excellent working arrangement with a Committee of the Minnesota State Bar Association. The membership is coming more and more to value the worth of a closeknit, working agreement with each other.

Malpractice litigation is becoming less and less. Biased, unscrupulous, professional testifiers are being eliminated from the picture in lawsuits and a whole-hearted attitude is being assumed by one member toward another in the courts.

A recent experience in Court shows the truth of the statement above. Picture a medical witness testifying before four of his colleagues in a suit involving the work of a member of his profession. In calm, quiet tones the questions are put before him by the defendant's and plaintiff's lawyers. No bickering, but a plain statement of true facts is elicited from the answers given. The jury did get the proper impressions from such testimony and the dignity of the two professions, law and medicine, was upheld before both Court and Jury. Truthful testimony injures no doctor. It is the sly insinuations by the lawyer and half-truths told by the witness doctor that spoil the best reputations.

The dreamed of ideal is becoming in truth a reality. B.J.B.

SECOND CONGRESS

Among several programs of unusual interest to be staged in connection with the 86th Annual Meeting of the Minnesota State Medical Association at the Minneapolis Auditorium May 31, June 1 and 2, is the second Congress of Allied Professions.

With an extended national health program about to be introduced into Congress, with new plans for medical practice in the air, with physicians under fire from many quarters, this second Congress assumes a great importance in the history of Minnesota's progress in medicine and public health.

The program for the Congress will include an outline of the attitude and plans of the Administration in Washington, also of the current program in Minnesota and practical possibilities for its extension. There will be a discussion likewise of various aspects of sickness insurance, both voluntary and compulsory. Speakers are being chosen very carefully to present different points of view and the program will consume an entire day of program time during which there will be no scientific sessions beyond the regularly scheduled exhibits and demonstrations.

The interest of physicians in public health education will be graphically demonstrated in a public health exposition which will occupy the ground floor of the Auditorium and which will be open to the public during the entire three days of the meeting. Every phase of health protection and disease prevention with which the average person should be acquainted will be demonstrated in this exposition. Appropriate committees of the state association will be responsible for the material shown. They will have the enthusiastic coöperation of all official and voluntary agencies interested in special phases of public health work.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

License of Two Hallock Physicians Suspended for Eighteen Months

In the Matter of the Revocation of the License of Kenneth Vincent Overend, M.D.

In the Matter of the Revocation of the License of Fred Earl Myers, M.D.

The Minnesota State Board of Medical Examiners at a meeting held on December 16, 1938, suspended for eighteen months, the license to practice medicine and surgery held by Kenneth Vincent Overend, M.D., and Fred Earl Myers, M.D., of Hallock, Minnesota.

Drs. Overend and Myers practiced together at Hallock and following an extended investigation by the Medical Board they were cited to show cause why their licenses as physicians should not be revoked for conduct unbecoming a person licensed to practice medi-

cine and detrimental to the best interests of the public. Both of them entered pleas of guilty before the Board. The evidence disclosed numerous cases of bilateral salpingectomies and other surgical procedures, some of which resulted in the miscarriage of the patient.

Mankato Physician's License Revoked

In the Matter of the Revocation of the License of Arthur W. Eckstein, M.D.

The license to practice medicine and surgery held by Arthur W. Eckstein, M.D., Mankato, Minnesota, was revoked by the Minnesota State Board of Medical Examiners on December 16, 1938. Dr. Eckstein was found guilty by the Medical Board of "immoral, dishonorable and unprofessional conduct," and, specifically with procuring, aiding and abetting a criminal abortion.

In 1932 Dr. Eckstein was before the Board on a similar charge and was reprimanded and placed on probation. In 1934 Dr. Eckstein pleaded guilty in the District Court at Mankato to the crime of abortion and was sentenced to two years at hard labor in prison. Upon his release he pleaded with the Medical Board for a chance to take the examination for a new license. Numerous physicians in Mankato endorsed him and a license was finally issued. Dr. Eckstein's first license was revoked in May, 1934.

In the present case Dr. Eckstein was seen on October 17, 1938, in the act of throwing a package over the Minnesota River bridge at Mankato. Subsequent investigation disclosed the contents as a fœtus, with the head severed from the body. He was arrested on the next day charged with abortion. Eight witnesses testified before the Medical Board. The criminal case at Mankato has not been disposed of.

License of Lake City Physician Suspended for Five Years

In the Matter of the Revocation of the License of Gottfried Schmidt, M.D.

The Minnesota State Board of Medical Examiners, on December 16, 1938, suspended for five years the license to practice medicine and surgery held by Gottfried Schmidt, M.D., Lake City, Minnesota. Dr. Schmidt was found guilty by the Medical Board of advertising "professional superiority to, and greater skill than, that possessed by fellow physicians and surgeons" and of "conduct unbecoming a person licensed to practice medicine and detrimental to the best interests of the public."

Numerous complaints had been received by the Medical Board as to the methods used by Dr. Schmidt in making a diagnosis and also in his manner of treating ailments. Letters also had been referred to the Board that were written and mailed by Dr. Schmidt, in his practice, to patients and others. These letters in the opinion of the Board are highly improper. Dr. Schmidt attempted to diagnose diseases by having the patient place some saliva on a piece of paper. Out of town patients mailed this paper to Dr. Schmidt at Lake City. He then proceeded to treat the patient by medicine sent through the mail. He also stated that he had a machine with which he could broadcast treatments.

Dr. Schmidt was admonished by the Board in 1936 to refrain from these practices. However, he persisted and the citation resulted. Dr. Schmidt was born in Minnesota in 1871 and graduated in medicine from the University of Minnesota in 1903.

Medical Board Orders the Kru Gon Company to Cease Operations in Minnesota

Following an investigation, conducted by the Minnesota State Board of Medical Examiners, The Kru Gon Company of Muncie, Indiana, was ordered to cease operations in the State of Minnesota on December 6, 1938. The investigation discloses that this company had a representative, one Edward L. Pepper, seventy-two years of age, who holds no license to practice any form of healing in the State of Minnesota, operating in the Rask Drug Store at Willmar, Minnesota. When an agent of the Medical Board asked Mr. Pepper what conditions Kru Gon Capsules were recommended for, he replied: "Stomach, liver and kidneys." When he was asked if they were of any value in the treatment of a gall bladder condition, he replied, "Absolutely." When he was asked what effect they would have upon gall stones, he replied that Kru Gon capsules would "dissolve" them. The drug store received 20 per cent commission on the amount taken in by the Kru Gon man, with the company paying the agent a salary. Mr. Pepper admitted that he knew nothing about the ingredients of the capsules and that while he had been with the company for 10 years, he had never been to the home office at Muncie, Indiana, nor did he know anything about the company. Advertising material was published in the local newspaper to stimulate business and contains many statements of a very questionable nature. When Mr. Pepper was advised that a complaint would be filed charging him with a violation of the Medical Act, and that this method of doing business would not be tolerated in the State of Minnesota, the company advised that they were ceasing operations at once.

The State Board of Medical Examiners is of the opinion that the acts in this case constitute a violation of the Minnesota law against fraudulent, misleading and deceptive advertising, as well as a violation of the Medical Act and the Basic Science Law. The Board respectfully requests that it be immediately notified if this company, or any representative of it, operates at any place in the State of Minnesota. To the Board's knowledge this company has operated in Winona, Duluth, Hibbing, Faribault and Mankato, in addition to Willmar.

Chiropractor Re-sentenced to a Term of Not to Exceed Eight Years in Prison

State of Minnesota vs. Herman V. Feenstra

On November 21, 1938, at Glencoe, Minnesota, Judge Joseph Moriarty sentenced Herman V. Feenstra, sixty-five years of age, to a term of not to exceed eight years in a Minnesota penal institution. Feenstra, an itinerant, unlicensed chiropractor, had been sentenced, on August 10, 1938, to a term of not to exceed four years in prison, following his plea of guilty to an information charging him with the crime of abortion. The investigation disclosed that Feenstra had a prior conviction in the Circuit Court at Brookings, South Dakota, for a similar crime, and under the Minnesota law, his sentence was doubled. Feenstra was first arrested in Minnesota, on August 8, 1938, by the late Sheriff Beihoffer of Glencoe.

At the time of his arrest, Feenstra stated that he graduated from the Davenport School of Chiropractic in 1922. He stated that he practiced chiropractic, for a time, at Elkton, South Dakota, but lost his license because of performing abortions. The records of the Circuit Court of Brookings, South Dakota, show that Feenstra forfeited a $2,500.00 cash bond on January 19, 1938, at which time he was under arrest on a charge of rape. Feenstra never held any license to practice any form of healing in the State of Minnesota.

OF GENERAL INTEREST

Dr. Frederick P. Arny of Preston, has been appointed coroner of Fillmore County.

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The engagement has been announced of Miss Lucille Quinn, of Minneapolis, and Dr. John R. Meade of Saint Paul.

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Dr. A. L. Abraham of Duluth, was the principal speaker at a meeting of the Arrowhead X-Ray Technicians Society held early in December. He spoke on "Some Technical Problems."

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Dr. J. D. Camp of Rochester, was the toastmaster at the banquet of the Twin Cities Society of X-Ray Technicians held December 10 at the Curtis Hotel in Minneapolis.

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Dr. L. M. Randall and Dr. W. B. Hunt of Rochester, were in charge of the program for the Travel Club, composed of midwest obstetricians and gynecologists, which met in Rochester on December 3.

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Dr. Theodore W. Stransky, formerly located at Mandan, North Dakota, has returned to his native city, Owatonna, where he has opened offices for the practice of medicine.

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Dr. Leslie G. Seebach of Red Wing, who has been an interne at Ancker Hospital, has qualified for appointment to the grade of assistant surgeon in the United States Naval Medical Corps, with the rank of lieutenant.

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Dr. Charles F. Code, recent recipient of the Theobald Smith Award, has been appointed instructor in physiology at the University of Minnesota for the current year. Dr. Code has worked the past three years at University College, London, and at the Mayo Foundation.

* * *

The engagement is announced of Miss Helen Butler, daughter of Mrs. R. N. Goldthwaite of Fort Sill, Oklahoma, and the late Colonel Clifton M. Butler, to Dr. Carl N. Giere, son of Dr. E. O. Giere, Saint Paul. Dr. Carl Giere is a University of Minnesota Medical School graduate.

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Correction: In the General Interest section of the December number Dr. Walter H. Judd, medical missionary, was erroneously stated to be the son of the late Dr. E. Starr Judd. Dr. Walter Judd is not related to the late Dr. Judd, although the family name is the same.

Dr. Milo M. Loucks, formerly of Flandreau, South Dakota, has located in Rushmore for the practice of medicine. He was Assistant Surgeon General of the South Dakota area of the United States Army for six years, and previous to that was an instructor at the University of Minnesota.

* * *

The docks and elevators Section of the Duluth Chamber of Commerce Industrial Safety Conference which met on December 7, at the Hotel Duluth, was addressed by Dr. G. A. Hedberg of Nopeming, on the subject of "Dust and Lungs." Other physicians appearing on the program, which was arranged by the St. Louis County Medical Society, were Dr. A. G. Athens, Dr. M. H. Tibbetts, Dr. F. T. Elias and Dr. Gordon MacRae. Dr. G. A. Earl of Saint Paul spoke on "Social Medicine."

* * *

Dr. Charles F. McComb, Duluth, eight times elected coroner of St. Louis County, retired the first of the year at the age of eighty-one. He will be succeeded by Dr. John W. Ekblad, who was elected to the office last November.

Dr. McComb was president of the Minnesota State Medical Association in 1888, was the first president of the Interurban Academy of Medicine and was twice president of the St. Louis County Medical Society since beginning practice in Duluth in 1883.

* * *

Medal Presented to Dr. Meyerding

Formal public presentation of the medal and scroll for distinguished service to the Minnesota State Medical Association was made to Dr. E. A. Meyerding at the state association banquet in connection with the 85th Annual Meeting in Duluth, June 30.

The presentation took place immediately after the Council action instituting the honor and before the committee appointed had selected the emblem.

A hand illuminated parchment and a gold medal bearing the seal of the association were later completed and inscribed in accordance with orders of the committee and actual presentation took place December 15 at a luncheon meeting of the Council at the St. Paul Hotel.

Dr. A. W. Adson, Rochester, chairman of the special committee, made the presentation. Dr. C. A. Stewart, Minneapolis, and Mr. W. W. Will, Bertha, the other committee members, also President J. M. Hayes of Minneapolis, Dr. George Earl, St. Paul, and Dr. W. F. Braasch, Rochester, recalled Dr. Meyerding's important contributions to medical organization in Minnesota and joined in praising the decision to award to him the first honor of this kind ever bestowed in Minnesota.

A similar medal and scroll will be awarded to other leaders who may from time to time merit the honor.

MEDICAL BROADCAST FOR JANUARY

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Saturday morning over Station WCCO, Minneapolis (810 kilocycles or 370.2 meters), and Station WLB, University of Minnesota (760 kilocycles or 395 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

January 7—Pneumonia.

January 14—Sciatica.

January 21—Anorexia Nervosa.

January 28—Heredity and Dental Caries.

MISSISSIPPI VALLEY MEDICAL SOCIETY 1939 ESSAY AWARD

The Mississippi Valley Medical Society offers a cash prize of $100.00, a gold medal and a certificate of award for the best unpublished essay on a subject of interest and practical value to the general practitioner of medicine. Entrants must be members of the American Medical Association. The winner will be invited to present his contribution before the next annual meeting of the Mississippi Valley Medical Society at Burlington, Iowa, September 27, 28, 29, 1939. All contributions MUST NOT exceed 5,000 words, be typewritten in English in manuscript form, submitted in five copies, and must be received NOT later than May 1, 1939. Further details may be secured from Harold Swanberg, M.D. Secretary, Mississippi Valley Medical Society, 209-224 W. C. U. Building, Quincy, Ill.

POSTGRADUATE INSTITUTE OF THE PHILADELPHIA COUNTY MEDICAL SOCIETY

The fourth annual Postgraduate Institute of the Philadelphia County Medical Society will be held in the Bellevue-Stratford Hotel, Philadelphia, during the week beginning March 13, 1939. The program will consist of some eighty-six clinical lectures on the general subjects of blood dyscrasias and metabolic disorders.

Philadelphia has always been in the van of medical progress and the yearly institute, at which last year there was a registration of 1,787, affords an opportunity for the several medical schools located in the city to present the results of their investigative labors.

The Philadelphia County Medical Society, Twenty-first and Spruce Street, Philadelphia, may be addressed for particulars.

EAST CENTRAL MINNESOTA

The East Central Minnesota Medical Society held its annual meeting on Monday, December 12, 1938, in Cambridge, Minnesota. Dr. Arthur Neumeier and Dr. Abraham Gunz of Lindstrom and Dr. Gladys Trommold of Anoka were elected to membership in the Society. Dr. Raymond Gully, formerly associated with the Nicollet-Le Sueur Medical Society was accepted as a transfer. The Society elected to honorary membership Dr. Thomas Zeien of North Branch.

The following officers were elected for the coming year: Dr. A. L. Arends, Sandstone, president; Dr. Walter P. Gardner, Anoka, vice president; Dr. Claire M. Ness, Cambridge, secretary-treasurer; Dr. H. C. Cooney, Princeton, delegate; and Dr. George Schlesselman, Anoka, alternate delegate.

Dinner was served and a scientific program was presented by guest speakers. Dr. Erling Platou of Minneapolis spoke on "Convalescent Sera as Therapeutic Agents," demonstrating with movies the technic of preparing the sera. Dr. Gordon Kammann of Saint Paul talked on "Neurosis."

MINNESOTA SOCIETY OF INTERNAL MEDICINE

Dr. Moses Barron of Minneapolis was elected president of the Minnesota Society of Internal Medicine at a meeting held in Rochester on December 3. Dr. R. M. Wilder of Rochester was elected vice president and Dr. Max H. Hoffman of Saint Paul was re-elected secretary-treasurer. D. G. B. Eusterman of Rochester is chairman of the Executive Committee; Dr. E. L. Tuohy, Chairman of the Education Committee. Minneapolis was selected as the place for the spring meeting.

NICOLLET-LE SUEUR COUNTY SOCIETY

At the annual meeting of the Nicollet-Le Sueur County Medical Society, held in Le Sueur on December 13, Dr. Nels Sonneyson of Le Sueur was elected president and Dr. P. J. Hiniker of Le Sueur, secretary. Dr. Burton Grimes of St. Peter was elected vice president.

Dr. Hobart Johnson, who has been a medical missionary for several years, gave a talk on "Practice of Medicine in Africa."

RAMSEY COUNTY SOCIETY

The following officers were elected at the meeting of the Ramsey County Medical Society, held Monday night, November 28, in the Lowry Medical Arts Building, Saint Paul: Dr. George N. Ruhberg, president-elect for 1940; Dr. R. B. J. Schoch, president; Dr. Arnold P. Gruenhagen, vice president; Dr. J. Allen Wilson, secretary-treasurer.

ST. LOUIS COUNTY SOCIETY

The annual meeting of the St. Louis County Medical Society was held on December 8 in Duluth. Dr. T. L. Chapman of Duluth, was elected president-elect; Dr. Gage Clement, Duluth, president; Dr. Andrew Sinamark, Hibbing, vice president, and Dr. Gordon MacRae, Duluth, secretary-treasurer.

Mr. J. G. Crownhart, executive secretary of the Wisconsin Medical Association, who was the principal speaker at the dinner, discussed the subject, "Socialized Medicine."

STEARNS-BENTON COUNTY SOCIETY

The Stearns-Benton Medical Society held its annual dinner at the Breen Hotel in St. Cloud on December 15. The following officers were elected: Dr. C. S. Donaldson, Foley, president-elect; Dr. W. T. Wenner, St. Cloud, president; Dr. E. M. Kingsbury, Clearwater, vice president; Dr. J. N. Libert, St. Cloud, secretary-treasurer.

UPPER MISSISSIPPI SOCIETY

The next meeting of the Upper Mississippi Medical Society will be held at the Ransford Hotel, Brainerd, Saturday, January 28, 1939. The following program will be given beginning at 3:30 p. m.:

Dr. Gordon Kamman, Saint Paul
"Vitamins and Encephalitis"

Dr. Viktor O. Wilson, Minneapolis
"The Basis for a Maternal and Child Health Program"

Dr. Chester A. Stewart, Minneapolis
"Nutritional Problems in Infancy"

Dr. O. J. Campbell, Minneapolis
"Some Observations on the Care of Fractures"

Dr. H. E. Michelson, Minneapolis
"Dermatology"

IMMUNE GLOBULIN (Human)

A preparation of globulins made from human placental blood and containing immune factor or factors against measles. The immunizing potency of the product is determined on the basis of the diphtheria antitoxin titer of the placental blood. Immune globulin (human) is useful in the prevention and modification of measles. It is equivalent in usefulness to convalescent serum but has the advantage of universal availability. It has the disadvantage of producing reactions not always mild. Most reactions, however, can be avoided by administration of the proper dosage. It is useful in the prevention of measles in institutional cases in larger doses than those given for modification. Protection should not be attempted until definite exposure has taken place. Immune globulin (human) has also been used (with caution) in the treatment of measles.

WOMAN'S AUXILIARY

MRS. J. F. NORMAN, Crookston, *President*
MRS. A. A. PASSER, Olivia, *Editor*

GREETING FROM THE STATE PRESIDENT

'Tis said, "It is never too late for a good wish." So, with the Christmas holidays disappearing only just around the corner, I welcome an opportunity to express again my sincere wish for a happy, and a prosperous New Year to every individual member of the Women's Auxiliary.

May the coming year bring to each one of us, strength and courage to face our own responsibilities without faltering.

Let us encourage the medical profession—our husbands—in the face of a trying situation to keep their ideals untarnished, to preserve the tolerance, and sympathetic understanding, the dignity and courtesy that has always made them a distinguished group among all men.

May we have renewed faith in ourselves, and in each other.

ELIZABETH B. ROBERTS,
State President

REPORT OF THE PRESS AND PUBLICITY CHAIRMAN

On November 8, members of the Washington County Medical Auxiliary met with their president, Mrs. J. W. Stuhr, presiding. This was their first meeting of the season. Five dollars was donated to the Scout Fund and five dollars to the High School "Radio Educational Project." A committee was appointed to outline the plans for the work of the year.

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At the November meeting of the Women's Auxiliary to the St. Louis County Medical Society, a turkey luncheon was served at one o'clock at the home of Mrs. D. C. Rood. Mrs. M. G. Gillespie, the president, presided. The meeting was followed by a musical program given by Mrs. Anderson Hilding, violinist, and Mrs. Donald MacGregor, pianist. A rummage sale was held in November under the supervision of Mrs. P. S. Rudie, Mrs. M. G. Gillespie, Mrs. C. M. Smith, and Mrs. Harry Klein. The proceeds from this sale are used for the philanthropic activities, which includes the distribution of Christmas baskets.

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The Hennepin County Auxiliary has had a most active season so far this year. On Wednesday, December 14, Mrs. F. A. Erb was hostess to the Hennepin County Auxiliary at Sarahurst, convalescent home for patients discharged from the Glen Lake Sanatorium, which is maintained by the Hennepin County Tuberculosis Association. The hours were from 2 to 4. Friday, December 2, the Hennepin County Auxiliary had its annual Christmas party in the lounge of the Medical Arts Building. A silver offering went for the rehabili-

tation home, Sarahurst. Mrs. A. E. Benjamin, Mrs. E. S. Strout, Mrs. J. M. Hall and Mrs. R. R. Noice comprised the hospitality committee. Christmas carols and Christmas legends were heard. New members of the Hennepin County Auxiliary were honored at a tea which was given in October at the home of Mrs. H. M. Lee, 4848 Russell Avenue South. The new members and officers were the guests of honor. Hennepin County officers for the year are: Mrs. R. R. Crammer, president; Mrs. E. S. Mariette, president-elect; Mrs. C. E. Willcutt and Mrs. J. S. Reynolds, vice presidents; Mrs. Harold G. Benjamin, recording secretary; Mrs. C. W. Laymon, corresponding secretary; Mrs. J. P. Hiebert, treasurer; Mrs. R. R. Noice, auditor, and Mrs. H. B. Hannah, custodian. Mrs. W. J. Byrnes is president emeritus and also serves as parliamentarian; Mrs. J. D. Lyon is historian and Mrs. J. S. Milton, editor.

Committee chairmen include Mmes. L. R. Boies, J. M. Neal, C. D. Creevy, J. M. Hayes, A. H. McFarland, P. J. Schultz, W. G. Beckman, F. A. Erb, J. C. Davis, Leo W. Fink, J. A. Watson, Hugh Tunstead, J. M. Hall, G. T. Nordin, W. W. Moir, Martin Nordland and J. A. Polzak.

At the October meeting the members heard a talk on current books given by Mr. J. H. Kittleson. On November 18 and 19 the auxiliary sponsored their annual sale of articles made by patients at Glen Lake Sanatorium, proceeds going to the makers of the articles. The Philanthropic Committee includes Mrs. J. C. Davis, chairman, assisted by Mrs. N. H. Lufkin, L. F. Richdorf, J. C. Miller, L. M. Larson, F. L. Jennings and Donald McCarthy.

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Nearly 10,000 talks were written by high school students throughout the state on the subject, "Tracking Down the Foe of Youth" in a contest conducted by the Minnesota Public Health Association in coöperation with the Women's Auxiliary of the Minnesota Medical Association. This was the eighth annual contest in which the Auxiliary participated. Mrs. Martin Nordland, Minneapolis, former state president, represented the Auxiliary on the committee of judges.

The best talk from each high school, selected by a preliminary public speaking contest, was entered in the state contest. From the manuscripts submitted, the judges selected the six talks they considered best, which were presented by their authors in a series of special broadcasts over WCCO during the week of December 12. Competing in the broadcasts for the radio plaque and silver cup awarded by the Auxiliary, were John Christianson, Moorhead; Robert Schwartau, Goodhue; Helen Kessler, St. Joseph's Academy, Saint Paul; Rosemary Perkins, Technical High School, St. Cloud; Jean Esala, Aurora; Betty Wallin, Red Lake.

Winners in the finals were John Christianson, Junior High, Moorhead; and Betty Wallin of the Red Lake Senior High School, located on the Indian reservation.

The following article is from the newsletter of the Woman's Auxiliary of the American Medical Association in which Mrs. Charles C. Tomlinson, the national president, tells of her visit to Minnesota the latter part of September:

"On Sunday, September 26, I left for Minneapolis to attend the Minneapolis Executive Board meeting—a very splendid meeting presided over by Mrs. W. B. Roberts, whose leadership assures a most successful year for Minnesota. Minnesota reports a steady increase of activity and membership, with twenty-five active units and over 1100 members. It was my privilege to share honors with Dr. Hayes, president of the Minnesota State Medical Society, in addressing the meeting. The interest and coöperation of this group was well attested by the attendance. When I entered the well-filled dining room of the Country Club, I wondered if I had misunderstood the invitation and was finding myself at a state convention. Again I saw many familiar national Auxiliary figures—Mrs. Martin Nordand, Mrs. S. S. Hesselgrave, Mrs. John Catlin, Mrs. Wm. Byrns, and our own past national president and present finance chairman, Mrs. James Blake. Through the courtesy of Dr. W. B. Roberts it was my pleasure to see the beautiful city of Minneapolis at its best. The restful lakes, beautiful homes, shrubbery and trees, already tinted to indescribable hues by the frost of Indian Summer. Tuesday morning, September 27, at the invitation of Dr. E. A. Meyerding, secretary of the Minnesota Public Health Association, I attended a breakfast given in Saint Paul, at the Hotel Lowry, honoring Mrs. Saidie Orr Dunbar, president of the General Federation of Women's Clubs. In the afternoon I was honor guest at a beautiful tea given by the Ramsey County Auxiliary at the home of Mrs. Edward Schons. It was a real joy to meet and know Mrs. A. E. Nichols, president of the Ramsey County Auxiliary, and the other members of this progressive group. A most enjoyable visit at Hopkins, in the home of Mrs. James Blake, completed my sojourn to Minnesota."

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On December 18 and 19 the members of the Women's Auxiliary of the Ramsey County Medical Society sponsored the play, "The Dream of a Clown," which was given at the Saint Paul Auditorium. The proceeds from this play will be used for various philanthropic purposes which will be announced in the next issue.

The Auxiliary received a nice response from members of the Ramsey County Medical Society and cooperation on the part of many prominent citizens and Saint Paul officials in this rather unusual performance. All parts were taken by members of the male sex and no little unexpected talent was displayed. The audience was kept in a constant state of laughter at the appearance and behavior of the actors.

MINNEAPOLIS SURGICAL SOCIETY

Stated Meeting, Thursday, November 3, 1938

RECENT ADVANCES IN THE SURGERY OF THE NECK

MARTIN NORDLAND, M.D.
Minneapolis

In the discussion of recent advances in the surgery of any region it is customary to review the history of the subject. Outside of the story of goiter, the history of the treatment of the various disorders about the neck resolves itself into the recording of occasional developments of certain new procedures. The treatment of the thyroglossal duct cyst by Sistrunk and the accidental development of the operation of tenotomy for the relief of symptoms from cervical rib by Adson are conspicuous examples. Patients with these disorders or pulsion diverticuli of the pharynx are encountered so seldom by the surgeon of average experience that mistakes in diagnosis are common and surgical mismanagement is frequent. This discussion will be limited to a brief review of the treatment of these conditions and to some of the newer developments in the management of goiter.

The surgeon has some important responsibilities beyond the immediate mortality which are peculiar to the treatment of the disorders of the neck and which are not common to the surgery of other regions. In the block dissection of the glands of the neck, because of the motor paralysis, he must protect and avoid the descending hypoglossus nerve; in the treatment of branchiogenetic and thyroglossal duct cysts he must consider and be responsible for recurrences. In the surgery of the thyroid he must be concerned not only with the mechanical complications such as injury to the parathyroid bodies and laryngeal nerves, but also he must be mindful of a good functional result. To deal with these responsibilities, he must be thoroughly familiar with the anatomy of the neck and be informed concerning the problems of hypo- and hyperthyroidism. The appearance of the scar is not the least of the surgeon's responsibilities in the surgery of this region. Patients are exacting. They demand an invisible scar corresponding to the natural folds of the neck, and justly so.

Thyroglossal Duct Cysts and Fistulæ

How rarely the patients with thyroglossal duct cysts are encountered by the surgeon of average experience is emphasized in a review of the technic of the treatment of this condition which was published by Sistrunk in 1928. He stated in his report that in 86,000 consecutive patients examined in the Mayo Clinic, only thirty-one thyroglossal duct cysts were found. Lack of thorough understanding of the mode of development of such cysts and of the anatomy of the base of the tongue and surrounding structures has frequently led to a wrong diagnosis and improper surgical management. It should not be difficult to make a diagnosis of such cysts with this knowledge of their congenital origin. The tumor is usually a firm cystic mass in the midline of the neck near the hyoid bone or the thyroid cartilage. The duct which runs from the cyst to the hyoid bone is usually felt. Sistrunk pointed out that operation for the cure of thyroglossal duct cysts and fistulæ are unsuccessful unless the epithelium-lined tract running from the cyst to the foramen cecum of the tongue is completely removed. He further pointed out that it is better not to attempt to isolate the duct above the hyoid bone because it is so small and friable. He suggested it was better to include some of the tissue on all sides around the duct from the hyoid bone to the foramen cecum. It is a harmless operation and, properly performed, prevents recurrences and results in 100 per cent of cures.

Pharyngeal Pulsion Diverticuli

The treatment of pulsion diverticuli of the pharynx recently developed by Chevalier Jackson is worthy of brief consideration. The technic he has recommended makes it possible for the surgeon of average experience to deal with this condition with good results. He has suggested the use of the esophagoscope in the dissection of the sac. With this aid the pouch is found more quickly and the contaminating contents can easily be removed before the sac is excised. This makes a cleaner operation. Jackson has found that an accurate dissection and excision of the cleaned sac and a closure with the finesse of arterial suture results in a safe one-stage operation. He further recommends a transverse incision in the natural fold of the neck. This, he contends, makes for better support and for inconspicuous healing.

Cervical Rib

The first important paper on the treatment of cervical rib was written in 1740 by Hunauld. More than 100 years later Gruber presented the second important contribution on this subject. These, and all subsequent articles, up to the time of the work of Adson and Coffey in 1927, recommended the complete or partial removal of the rib or section and removal of the prolongation for surgical relief. While operating upon a patient, they were compelled to discontinue after they had proceeded as far as section of the insertion of the scalenus anticus muscle, intending to complete the procedure in a second stage. To their surprise, the patient was completely relieved of symptoms by simple tenotomy and since then they have practiced this as the operation of choice with much success. When possible, this procedure is better than removal of the cervical rib, in that it is simpler and avoids traction upon the brachial plexus. Simple tenotomy obviates the temporary palsy of the brachial plexus which often happens in the removal of the cervical rib and complete relief of the symptoms is obtained. The procedure is

a most notable contribution to the operative relief of cervical rib pressure.

Thyroid Disease

Goiter has been a familiar malady for thousands of years. Through the work of Bilroth, Kocher, Halstead, Mayo and deQuervain, it is now more than fifty years since operations on goiter have acquired a position among the accepted procedures of surgery. The mortality rate at the present time is less than 1 per cent. A student of the history of this subject will find that some surgeons in the last century achieved almost as much in the surgical management of goiter as is being accomplished today. Much of the recent study of thyroid disease has been concerned with endocrine interrelationships, iodine in its relation to the diagnosis, prophylaxis and treatment of goiter, blood iodine and the evaluation of the basal metabolic rate. The value of polar ligation in the two-stage operation for hyperthyroidism has been recently re-established by Lahey. He has also made a valuable recent contribution in his introduction of the intratracheal catheter for anesthesia in the management of intrathoracic goiter. Total ablation of the thyroid in the treatment of heart disease has been developed since 1932. During the past five years there has been continually a repetition of attempts to cure goiter by other means than surgery. Most conspicuous of these is the application of roentgenotherapy. So far, it has not made a significant impression.

Iodine, Prophylaxis and Treatment

Although the clinical use of iodine is probably a medical problem, the surgeon who is handling patients with thyroid disease is repeatedly called on to state whether or not iodine should be used in a given case. According to Dinsmore the clear-cut indications for the use of iodine are:

1. Small doses during pregnancy, especially to women who have enlargement of the thyroid.
2. As a prophylactic measure in doses of 10 mgm. a week to school children.
3. For the adolescent boys and girls who have simple goiters.
4. As a pre-operative medication in all patients with hyperthyroidism regardless of the type of the gland.
5. In cases of residual or recurrent hyperthyroidism.
6. As a therapeutic test in borderline cases.

Blood Iodine

Many studies have recently been made relative to the value of blood iodine. Although the procedure may have distinct diagnostic value, its application is limited. Certainly there is no indication for its use in the presence of frank hyperthyroidism. It may, however, be of some value in making a differential diagnosis when it is difficult to determine the basal metabolic rate, such as in hypertension, in young children, and in encephalitis. In spite of the simplification of the technic, it is still a rather difficult laboratory procedure. In many of the borderline cases, it has been pointed out that the chief value comes in finding a normal blood iodine. Also, there are patients who have clear-cut hyperthyroidism with normal blood iodine.

Multiple Stage Operations

Lahey has re-established the importance of polar ligation and has emphasized its value. Mortality in the surgery of hyperthyroidism is due either to some lesion of the heart or kidneys or occasionally to some lung complication. A few of these patients die from postoperative crisis. It is in this last group that the two-stage operation should be employed. The use of Lugol's solution, introduced by Plummer in 1923, was a great advance in the management of hyperthyroidism. In spite of its employment in the preoperative preparation of this group of patients, there is still a group of about 5 per cent of patients with hyperthyroidism who cannot be made satisfactory surgical risks by the prolonged medical treatment. Polar ligation or a two-staged operation is imperative under such circumstances. The decision to perform a multiple stage procedure may be made preoperatively or after the operation has begun. A patient with marked hyperthyroidism whose pulse rate cannot be reduced by the administration of iodine and rest should have a two-stage operation. No patient should be operated upon for goiter in a one-stage operation who is losing weight. Patients with recent vomiting and diarrhea associated with an elevated basal metabolic rate usually need a two-stage operation. During the operation the patient with a progressively rising pulse and an increasing pulse pressure should have a two-stage operation. If, during the operation, technical difficulties are encountered, such as excessive bleeding, consuming much time, a two-stage operation should be contemplated. Lahey asserts that 22 per cent of the patients in his clinic are subjected to the preliminary polar ligation. He reasons that a patient with hyperthyroidism dying following a one-stage operation, might have lived with a two-stage resection; and, further, that a patient dying after a two-stage resection might have lived with a preliminary ligation of one or both of the superior poles.

Intrathoracic Goiter

In the surgical management of the intrathoracic goiter, Lahey has recently advocated intratracheal anesthesia. Whether one employs ether, nitrous oxide gas, ethylene, or cyclopropane, the most recent anesthesia which is now being used, it then becomes purely a matter of the anesthetist's choice so long as an intratracheal catheter has been introduced.

In all intrathoracic goiters in which there is any considerable narrowing of the trachea and in which the intrathoracic tumor is of any considerable size, there will always be the danger of difficulty in making the tumor pass through the upper thoracic strait, thus producing pressure upon the trachea and, without an intratracheal catheter, causing the danger of suffocation.

It should be borne in mind in dealing with the tracheal obstruction in intrathoracic goiter that the performance of tracheotomy is extremely undesirable.

With the tube in place, any amount of manipulation and pulling, hauling and prying of the mass out of the mediastinum can be undertaken without danger of interfering with the respiration.

Total Thyroidectomy for Heart Disease

Total ablation of the thyroid for heart disease has been developed since 1932. According to Berlin, only those patients should be selected for this operation who, despite all available medical measures, continue to remain chronic invalids. In general, patients with slowly progressive heart disease who continue to suffer recurrent attacks of cardiac failure on exertion over a prolonged period of time will probably respond to the operation favorably, but those showing a short and rapidly progressive course should not be subjected to it. The operation is contraindicated also in the presence of severe impairment of renal function, acute pulmonary infection, or active rheumatic infection. The same consideration of the rapidity of the course of the condition should govern the selection of cases of angina. If the patient's history shows a rapid increase in the number of attacks, thyroidectomy will probably not give lasting results. When the metabolism is minus 15 per cent, operation should not be recommended. Of Berlin's patients with angina pectoris or congestive failure who were operated upon from one to two and one-half years ago, approxmiately 70 per cent showed marked or moderate improvement following the total ablation of the thyroid gland. In the last sixty-two cases there was no operative mortality. Berlin called attention to the danger of bilateral injury of the recurrent laryngeal nerve and advised laryngoscopic examination after the ablation of one lobe.

X-ray Treatment of Hyperthyroidism

Roentgen therapy has frequently been suggested in the treatment of hyperthyroidism. While it is admitted that in a large number of cases treated by x-ray there is a gradual improvement of the patient, radiotherapeutic methods have several serious drawbacks. The dosage is difficult to determine. The favorable result in the beginning may, due to the cumulative action of the x-rays, eventually prove to be excessive. This treatment has none of the precision of the operative treatment. It cannot conceivably be of any benefit in toxic adenoma. Arnold Jackson states that in the cases he has observed that have been treated with x-ray, the goiter has not been cured but the basal metabolism rate has been merely decreased so that the patient continues to run a low-grade hyperthyroidism. As a result of this the myocardium gradually becomes damaged and permanent injury results. He has seen a great many failures from x-ray therapy, and also a large number of cases with burns of the skin. Means and others have expressed similar opinions.

deQuervain asserts that radiotherapy is contraindicated in those cases of goiter which sooner or later come to operation. He states that inherent difficulties of an operation for exophthalmic goiter are increased to such an extent by x-ray as to almost render the operation impossible and that the adhesions after x-ray treatment are only to be compared in many cases to those produced by a previous thyroidectomy and usually they are more marked.

deJ. Pemberton in discussing the employment of irradiation in the treatment of exophthalmic goiter states that "it is based on the conception that the hypertrophic parenchymatous cells of the thyroid gland, as well as the lymphocytic infiltration commonly associated with the histologic changes found in this disease, are peculiarly radiosensitive, while the normal cells are peculiarly radioresistant. The functional activity can thereby be diminished without destruction of structure. Experimental proof is lacking that involutional changes occur in the thyroid gland of exophthalmic goiter after irradiation, for the difficulties of obtaining specimens from patients with exophthalmic goiter before and after irradiation are obvious. However, in a series of 4,061 patients with exophthalmic goiter operated on in The Mayo Clinic in 1926 to 1928, inclusive, the records show that 291 (5 per cent) had had previous treatment with irradiation. At operation only occasionally could the surgeon recognize any gross changes in the gland itself to indicate that it had been iradiated, and Broders was unable from miscroscopic study to distinguish that irradiated tissue from tissue that had not been irradiated." He further states that "after recognition of the value of iodine in reducing the operative mortality among patients with exophthalmic goiter, a paper was published by all the members of the committee of the Massachusetts General Hospital in which they compared the results of irradiation with those of surgery, and concluded that iodization followed by subtotal thyroidectomy is the best treatment of exophthalmic goiter. It is significant that the conclusion reached by this group of internists, surgeons and radiologists, namely, that surgery offers the best results in the treatment of exophthalmic goiter, tallies with the conclusions of similar groups of observers who have had wide experience in the care of patients with this disease. In The Mayo Clinic, irradiation has been employed in selected cases of exophthalmic goiter. In a small proportion of the cases, improvement has followed treatment, whereas in the others no change in the severity of the hyperthyroidism could be detected. Since the administration of iodine has proved superior as a preoperative preparatory method, irradiation has not been used in recent years except occasionally in a very small group of cases refractory to iodine. In these, the results have not been encouraging."

Personally, I believe that x-ray treatment is indicated in a certain small group of cases with hyperthyroidism when this treatment is administered by properly trained roentgenolists.

Discussion

DR. L. H. FOWLER: We are indebted to Dr. Nordland for a very interesting and complete survey of some of the important surgical conditions of the neck. There are several points worthy of discussion but in view of the length of the program, I feel that we should proceed with the other papers of the evening.

PRESENT STATUS AND MODERN ADVANCES IN THE SURGERY OF THE CHEST

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Chest surgery is the youngest but at the same time probably the oldest special division of surgery. It is the youngest in its marked recent development but oldest by historical record for any of you who happen to be familiar with the Good Book may remember where it says "The Lord cast a deep sleep over Adam" and then the resection of the rib followed.

The modern developments in thoracic surgery have come about for three principal reasons: (1) improved diagnosis in the various conditions within the chest; (2) improved knowledge of the physiology of the chest, not so much from the standpoint of the physiologist as appreciation of it by the surgeon; (3) improvement in anesthesia and anesthetic technique and the use of oxygen therapy which has made many things possible in chest surgery.

Among the improvements in diagnosis which have come about in the last ten years or so, I think one should be mentioned specifically. It is an improvement in x-ray technic, in the use of the tomograph or laminograph through which it is possible to make films as serial sections a centimeter or two in thickness for the localization of abscesses, foreign bodies and various other lesions. They have been of great value and they will be of more value as time goes on. The method is not in common as yet but it is not a difficult matter to construct the apparatus and it will help us considerably in our diagnoses.

"Another thing which has helped is bronchoscopic examination and bronchoscopic treatments in thoracic lesions. Many of the conditions that we see in chest surgery now are better understood because of the knowledge which has been contributed through bronchoscopy, yet even today bronchoscopic examinations are not performed nearly as frequently as they should be. Esophagoscopic examination is also of value but likewise is not used as much as it should be. Another step in diagnosis which is neglected very often is the aspiration of fluid from the chest and replacement with air to permit better x-ray visualization of the thoracic organs and diagnosis and localization of various lesions in the chest. Careful microscopic study of aspirated fluid may help greatly in diagnosis.

Another neglected diagnostic procedure is the use of the thorascope. Where the lung is already collapsed by air or fluid is withdrawn and replaced with air a telescope or thorascope may be introduced and the interior of the thorax visualized very clearly. An accurate diagnosis may at times be made or biopsy specimens may be taken. This will eliminate a considerable number of exploratory thoracotomies, and is something that should be used more widely.

A number of years ago intrathoracic operations were somewhat of an ordeal. Under nitrous oxide anesthesia for open thoracotomy, fifteen to thirty minutes was about as much as any patient could stand, and the operation was a struggle for the patient as well as for the surgeon. Now, with modern anesthesia, it is possible to open the chest widely and leave it open for an almost indefinite period of time for surgical procedures and still keep the patient in good general condition. The use of the pressure cabinet which was used years ago when the chest was opened, has been abandoned and positive pressure anesthesia has taken its place. A knowledge of the effects of shifting mediastinum, movable chest wall, tension pneumothorax and sucking chest wounds, have all aided in our handling of thoracic conditions and helped us to treat these conditions much more safely than we could before such things were properly understood.

As far as anesthesia is concerned, I will leave that to Dr. Ralph Knight who really knows the subject. I merely follow along and try to work as he takes care of the patient.

Probably the first of the various phases of chest surgery that should be mentioned is the surgery of pulmonary tuberculosis. I mention this first not because I am interested in it primarily but because it constitutes such a large percentage of thoracic surgery today. Thoracoplasty, of course, is used much more widely now than it was a few years ago. All types of collapse therapy, in fact, are used more commonly. Ten years ago at Glen Lake only about 10 per cent of the patients discharged from the Sanatorium had been treated by any type of collapse while in 1937 53 per cent of the patients discharged had been so treated. This is just an indication of the increase in the use of such procedures. Thoracoplasty, of course, is not a new operation and there are probably more varieties than there are kinds of Heinz pickles. There are many special methods. Personally, I think that you should fit your survery to your patient, fit the type of operation to what the patient needs and can tolerate rather than to follow any special routine. One of the variations in thoracoplasty which has been developed in the last few years is the so-called Semb operation or an extra-fascial apicolysis in which, in addition to thoracoplasty, there is added a dissection of the dome of the pleura from the bands of Sibson's fascia, Sibeleau or Zuckerkandl bands, to allow the lung to collapse not only in a lateral and antero-posterior direction but also in a vertical direction. I believe there are some advantages to this procedure, but I don't think it is something to use as a routine. Probably 25 per cent of patients as we see them need something of the sort, but a number of those who need it can't have it because everything is bound down too much. If it is used as a routine, of course, you will have a great many good results but about 75 per cent of the patients do not need this added collapse.

Apical stripping, true apicolysis or extrapleural stripping combined with thoracoplasty is of value. There are some disadvantages there which are not generally appreciated, largely the danger of contamination with tubercle bacilli from tearing into tuberculous tissue as well as the danger of injury to the brachial plexus,

the large veins in the apex, injury to the sympathetic, etc.

The past ten years have seen the rise and fall of two types of thoracic surgery. One is phrenic nerve surgery about which many men became so enthusiastic that there were reports made of a series of several thousand performed within a few years. It was then done almost as a routine. Now it has fallen largely into disrepute. I believe that it has a definite field though it is much smaller than was originally anticipated. The same thing may be said of section of the scalene muscles to allow relaxation of the upper portion of the chest. It was used rather extensively for a while but now it is almost abandoned.

Pneumothorax, of course, is used much more widely than previously. Bilateral pneumothorax is now a common procedure whereas ten years ago it was somewhat of a rarity. It is started, of course, much earlier than it used to be. Oleothorax, that is, the substitution of an oil filling for the air pocket in pneumothorax has a definite field, particularly in patients who have to be sent out into outlying districts where they can't obtain air refills. There are certain disadvantages to it but I think it has a small field in the treatment of tuberculosis.

A new procedure which has been introduced in the last year or two, that is, extra-pleural pneumothorax, will, I believe, probably have a small field. At the present time many men are as enthusiastic about it as they were about phrenic nerve surgery a few years ago and undoubtedly will overdo it. It is used in patients who have an obliterated pleural cavity so they cannot take an ordinary artificial pneumothorax and who are not suitable for thoracoplasty. A piece of rib is resected posteriorly and parietal pleura stripped from the inside of the chest wall, apex and upper mediastinum. The wound is then sutured, leaving the space filled with saline which is aspirated in a day or so after the wound is sealed, and replaced with air. The collapse is maintained by extrapleural injections of air under positive pressure from that time on. Certain patients who are desperately ill, have large cavities, and are not good subjects for thoracoplasty or other radical surgery, may be helped by this method. It is very much an institutional type of procedure, and at the present time there are very few places where a patient can be sent out of a sanatorium and still be carried on such a procedure. Extrapleural oleothorax may be the answer to this problem.

Extrapleural paraffin "Plombe" which is not new, I believe, has received added interest in the last few years. We have had a series of approximately one hundred patients with some very nice results. It is not altogether fool-proof but there is a place for it.

Pneumo-peritoneum is another procedure which has been added to our therapeutic measures in pulmonary tuberculosis. Air is injected into the peritoneal cavity with the idea of pushing the diaphragm up, immobilizing the lung and obtaining some improvement by this immobilization. With pneumo-peritoneum it is perfectly possible to push the diaphragm up to the third rib on each side. The patient may become short of breath, or have difficulty with the gastro-intestinal tract for the stomach is collapsed by the pressure that is used. So far, I am not convinced that it has helped a great many patients. It is something to use where you cannot use anything else, and in that way may be worth while.

In general, I would say that the most important change in collapse therapy has been its wider use and earlier use. It has given us better results because the patients were in such condition that they could expect more because they had not become depleted by prolonged or extensive disease.

The field of empyema has shown little change in the last ten years. A number of trick methods of treating empyema have been introduced but they are usually fads and have not changed the field appreciably.

In the treatment of lung abscess, the old standard, two-stage external drainage is still good. Lobectomies, however, are being considered more frequently and are being used occasionally for the treatment of special cases. We have a man down at the General Hospital now in whom lobectomy was done in preference to an external drainage because of repeated profuse pulmonary hemorrhage, where we feared that he might bleed to death from the lung while we were waiting for the pleura to become adherent before the second stage. It has worked out very nicely. Bronchoscopic aspiration and localization has been of value. A considerable number of lung abscesses can be treated bronchoscopically and good results can be obtained in this way without external drainage. The whole thing is, if results are obtained in two or three treatments through the bronchoscope and adequate drainage established, all well and good. If results are not obtained within two or three treatments, then it is time to stop and do something else. There is no necessity for carrying it on for months.

The surgical treatment of bronchiectasis has received increased attention in the recent years. The Graham cautery is not used as much as previously, though I believe it still has a field in the treatment of bronchiectasis complicating pulmonary tuberculosis.

Lobectomy and pneumonectomy have been used rather widely and some excellent results obtained. The results of lobectomy have improved while the mortality has dropped from the 40 per cent of a few years ago to around 2 to 4 per cent in certain series. Pneumonectomy is still a procedure of considerable magnitude and carries a considerable risk. It is, however, justifiable in some of these patients.

Carcinoma of the lung is one condition which was untouched a few years ago but is now treated by thoracic surgery. The first case of carcinoma of the lung successfully treated by pneumonectomy was by Graham in 1933. Early diagnosis, of course, is essential. We must suspect carcinoma of the lung and look for it, bronchoscope the patient and use iodized oil or we will never find it in an operable stage. Even today about nine cases out of ten that you see have progressed too far for successful surgical treatment when the diagnosis is made. Pneumonectomy is the surgical procedure of choice as it gives a chance to

remove the regional nodes as well as the whole of the involved lung. It still probably carries a mortality of about 25 per cent, depending upon local conditions but as we have nothing else to offer in carcinoma of the lung I believe the risk is justified.

Benign tumors of the lung, adenomas, etc., have been recognized in increasing numbers in the past few years and successfully treated through the bronchoscope. A considerable number of these have probably been treated by diathermy, x-ray and other means within the past ten years and reported as carcinomas of the lung and good results obtained.

The other fields in thoracic surgery have not changed particularly. There have been procedures developed for drainage of mediastinal abscesses, but it is still a very desperate condition. Mediastinal tumors have been successfully removed by modern thoracic surgery under intratracheal anesthesia. The esophagus may now be resected. There have been a number of cases in which the Thorek operation, for complete removal of the esophagus with an external communication established through a rubber tube, have been reported. A few of these have come out rather well.

Cardiac surgery has shown a few improvements but nothing startling. A number of cardiac wounds have been successfully sutured. The effects of cardiac tamponade have been recognized and the importance of its relief stressed. Pericariolysis by the Brauer operation of taking out the overlying ribs and cartilages or the more radical removal of the calcified pericardium, has been used from time to time. It is still a procedure which offers something but is not of too great value.

Two procedures have been introduced in cardiac surgery with the idea of establishing increased blood supply to the myocardium in patients with angina. In the Beck operation the pectoral muscles are transplanted into the pericardium as a pedicle flap to form adhesions and give increased blood supply. Some nice results have been reported but they have all been done on early cases, and the late results are not yet available. The O'Shaughnessy operation in which the pericardium and the diaphragm are both opened and the omentum pulled up and sutured in the pericardium to form adhesions is an accessory of the same type. The Trendelenburg embolectomy for removal of pulmonary emboli has been used a number of times, but the whole difficulty seems to lie in diagnosing what patients need it. It is probable that a considerable number of patients who have recovered might have recovered without operation. It probably never will have a very wide field of usefulness.

ANESTHESIA IN CHEST SURGERY

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Even in thoracic surgery there is a considerable choice of anesthesia methods.

For thoracoplasties of not too great an extent, such as those required in the treatment of empyema cavities, and even for the removal of several ribs, especially the lower ones, in the treatment of tuberculosis, paravertebral anesthesia is always to be considered. To accomplish this 10 c.c. or a little more of a 1 per cent solution of procaine, or metycaine, is deposited just below the tip of the transverse process of each vertebra of the segments involved. With rather slow and careful surgery, to avoid too great tugging and jarring of the patient, extensive resection and even disarticulation of ribs can be accomplished.

Peridural anesthesia is another form of regional anesthesia which is sure to be further developed in chest surgery.

One must not forget that spinal anesthesia has, in many hands, an extensive field in chest surgery. It must be administered with a special technic. A weak solution of procaine must be used because a large volume is required and because one must count upon obtaining sensory anesthesia without motor paralysis. Procaine is the drug of choice because anesthetic doses of others tend to produce more motor paralysis. From 10 c.c. to as much as 15 c.c. of a 2 per cent solution is injected intradurally in the lumbar region. If properly done, satisfactory anesthesia is obtained and the patient can breath and cough as directed by the surgeon. Any type of operation upon the chest wall and even lobectomy can be performed, some surgeons preferring spinal anesthesia above all others for lobectomy. I know of none who is using it for pneumonectomy and I believe it would be impractical.

For limited thoracoplasties some chest surgeons are employing intravenous anesthesia. Although I am very fond of intravenous anesthesia for many purposes I feel that it is not quite suitable for this. The patient is usually on his side and the lower arm is usually compressed at the axilla, interfering with free venous flow. The upper arm is subject to sudden movements with the work of rib resection. This makes it almost impossible to administer the anesthetic into either arm smoothly and certainly enough. If one attempts to use a foot vein he is too far away for good observation of the signs of anesthesia. Another disadvantage is still more important. During operations upon the chest one must have definite control over respiration. In intravenous anesthesia respiration is apt to be greatly subdued and there are no adequate means of control such as accompany local or inhalation methods.

Inhalation anesthesia offers certain advantages over all other types for chest surgery. As Dr. Kinsella suggested, time is unlimited and respiration is under absolute control by the anesthetist. The patient is, of course, unable to cough out secretions as he can do under spinal and local anesthesia but the anesthetist can keep the bronchi clear by aspiration. In order that lung movement and ventilation can be perfectly controlled and secretions cleared away, inhalation anesthesia for all chest surgery, except quite limited procedures upon the chest wall, should be administered through an intratracheal tube. At the University Hospital for several months we have introduced all intratracheal tubes under intravenous anesthesia, thus saving the patient and anesthetist a long gas-ether induction.

We have found this very satisfactory from all standpoints. Anesthesia is then maintained by inhalation through the tube. There has been some general discussion, of course, regarding the propriety of introducing a tube into the trachea in cases of tuberculosis, the fear being that the irritation might tend to light up an infectious process. The obvious advantages are much greater than any theoretical disadvantages and have been generally recognized as such. With this technic, anesthesia can be safely conducted and operation carried on, even with the chest open, for a longer period of time than in almost any other type of surgical procedure. Cyclopropane is the inhalation anesthetic of choice for this work. There are no others which compare with it in value for chest surgery. The advantage of high oxygen and ability to carry the anesthesia with quick changes from light to deep and deep to light according to the needs of the situation are all there and all should be taken advantage of. At the close of the anesthetic a thorough "tracheo-bronchial toilet" should be carried out by aspiration with a catheter through the tracheal tube and the anesthetist should then inflate the lungs with air to replace the rapidly absorbable oxygen and anesthetic gas. The bag should be emptied and refilled with air several times and bag-pressure of 12 mm. mercury applied intermittently during each inspiration. The aspiration and air inflation are the best safeguards against the danger of atelectasis.

PRESENT STATUS OF GALLBLADDER SURGERY

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During the past ten years, a tremendous volume of literature has been published concerning the gallbladder and the biliary tract. A relatively small amount of this has dealt with the surgery of this region, but notwithstanding, a sufficient discussion has developed to establish some definite departures from the previously accepted doctrines.

Largely through the efforts of Andrews and his associates, the concept of gallbladder disease under the term "cholecystitis" has been subjected to careful inquiry.

A review of the published experimental and clinical investigations fails to disclose sufficient evidence to state that cholecystitis is bacterial in origin. The status of the theory may be summarized as follows:

1. Bacteria are seldom found in the gallbladder wall or content.
2. Microscopic studies are not characteristic of bacterial invasion elsewhere.
3. Experimental cholecystitis cannot be produced except occasionally by overwhelming doses of bacteria.

On the contrary, the characteristic changes of cholecystitis can be produced by chemicals and foreign bodies. The evidence at the present time seems to indicate that cholecystitis is not primarily a bacterial disease.

That this conclusion is generally accepted may be inferred by the infrequent mention of the gallbladder as a focus of infection and the abandoning of the idea that it is a sequel to appendicitis or a forerunner of pancreatitis or peptic ulcer.

Further corroboration is to be found in the work done relative to the formation of gallstones. Boyden's demonstration of bile stasis in pregnancy and the investigation of Abrahamson, Neumann, Walsh and others show beyond reasonable doubt that infection is quite unnecessary or at most incidental in the development of cholelithiasis.

As a result of this changing concept of gallbladder disease and also as the result of more careful postoperative surveys, the prevailing opinion amongst surgeons here and abroad is that operations upon the gallbladder are rarely necessary unless stones are present.

Lahey contends that every patient having stones in the gallbladder with or without symptoms should be subjected to cholecystectomy on the grounds that in so doing the incidence of common duct stone will be lowered. Opposed to this extreme view are Andrews, Foss, Graham, Stanton and others who feel that only the stone-bearing gallbladder which gives definite symptoms should be a candidate for operation, and cite a mortality of 1 per cent in all untreated cholelithiasis in the registration area.

Lahey also maintains that of the cases coming to operation for gallbladder disease, 50 per cent will require exploration of the common duct. The reports of Best, Pool, Sweet and others tend to support this belief, but this by no means represents a majority opinion.

A compromise, however, appears to be developing through the more general use of the cholangiogram. In 1932 Mirizzi suggested cholangiography with lipiodol, and in 1936 Robbins and Hermanson proposed the use of hippuran. Since this time, the procedure has been popularized by Walters, Mixter, Best and many others. At the present time, the prevailing practice may be summarized as follows:

When a patient is operated upon for gallbladder disease, the common duct for at least a short distance is exposed and examined. If it is found to be dilated, one of two courses may be followed. The bile may be aspirated by needle and examined. If abnormal in any respect, the common duct is then opened, explored and drained. An alternate procedure is to inject a radiopaque substance directly into the common duct either through a sectioned cystic duct or through the common duct wall by means of a needle and obtain a cholangiogram at the operating table. This technic appears to be the more popular not only in identifying common duct stone or obstruction preliminary to choledochotomy, but for the purpose of demonstrating residual stones after operation.

Paralleling the development of cholangiography and on the basis of investigations by Boyden, Ivy, Westphal and other physiologists, is the rise of a considerable interest in the so-called choledochus sphincter dyskinesia. It has been shown that spasm of the sphincter of Oddi may not only be of sufficient degree to cause

pain, but also to the point where reflux jaundice and liver damage occur.

Walters and others have shown that such spasm may be responsible for the occasional colic following cholecystectomy or choledochotomy. It has also been shown that sphincter spasm is relieved by nitrites but augmented by morphine.

Best puts this phenomenon to further use in an attempt to flush out the biliary tract by first employing desoxycholic acid to raise the intra-ductal pressure and then suddenly releasing it by the administration of nitrites. Colp has devised an instrument for intraductal section of the sphincter, while Bakes, Allen and others prefer forcible dilatation with bougies. These technics, while simple in conception, are not so simple in practice, and as yet are not in common use.

It would appear from the knowledge gained thus far that cholangiography is a valuable, safe adjunct to surgery and that preliminary investigation of the sphincter mechanism may help to differentiate gall bladder disease from sphincter or common duct derangement.

The case for acute cholecystitis must be considered quite apart from all else, as it is still a battle ground for surgeon, pathologist, physiologist and anatomist. While it is true that the concept of acute cholecystitis is changing, there is at present insufficient evidence, clinical or experimental, to identify it as a bacterial, chemical or foreign body reaction. The modern trend of treatment appears to be based more upon the clinical behavior of the organ than upon its pathologic picture. Bergh's recent review of the literature illustrates very well the existing confusion.

The most that can be said is that acute cholecystitis is being treated by competent surgeons in one of three ways: (1) immediate cholecystectomy; (2) early cholecystectomy; (3) late or interval cholecystectomy. The published mortality tables are not sufficiently comprehensive to validate any one procedure to the exclusion of others.

In all the foregoing phases of biliary tract disease, jaundice is a not infrequent complication. It is not within the scope of this discussion to consider this phenomenon except as it affects surgical practice. The prolonged bleeding time in the severe grades of jaundice has recently been investigated with some gratifying results. Ivy, Ravdin, Greene, Snell and others have demonstrated conclusively that calcium deficiency has no relation to the bleeding tendency. Following Quick's discovery of a method for determining prothrombin, Almquist and Stockstad in this country and Dam and Schonheyder in Denmark identified prothrombin alteration with vitamin K deficiency. Ivy also found that the prothrombin level could be restored by large doses of viosterol. As a result of this work, the hemorrhagic tendency of jaundice has been brought under control and the fear of post-operative bleeding is no longer a deterrent to surgery. To measure bleeding time more accurately and provide a better index of operability, Ivy devised a method which to the present date is satisfactory for both clinical and experimental purposes.

In summarizing this brief review, little remains except to emphasize the slow but apparent change in the concept of gallbladder disease, and the importance of the duct sphincter mechanism as demonstrated by newer methods of study.

Discussion

DR. E. A. REGNIER: The essayists this evening have made their papers so inclusive that very little is left to be said on the subject. The impression that one gathers after listening to Dr. Zierold's presentation is that we have about as much latitude in gallbladder surgery today as we had twenty-five years ago. Many phases of the subject are still rather controversial, hence every case must be individualized.

One phase of gallbladder disease, namely acute cholecystitis, must be brought to your close attention. We must keep in mind that acute cholecystitis in the first twenty-four to thirty-six hours of its development is not an acute suppurative process. Sections made from these tissues show few if any bacteria in the gallbladder wall; likewise, few bacteria in the contents of the gallbladder. It is generally recognized that the first stage of this inflammatory process follows obstruction of the cystic duct. After thirty-six hours, or thereabouts, an acute suppurative process usually develops and subsequently there is a certain amount of hepatitis adjacent to the gallbladder.

Some men looked upon the early changes in acute cholecystitis is an allergic phenomenon. I believe that this is a new avenue of approach to common-duct surgery.

The jaundiced patient, together with the variations and alternations in the bleeding and clotting time of blood in these patients is a problem that can be best met or solved by the use of frequent blood transfusions to replenish the prothrombin in the blood stream. When synthetic vitamin K is generally available its use may obviate the necessity of blood transfusion.

RECENT ADVANCES IN SURGERY OF THE ABDOMEN AND ABDOMINAL WALL

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I have tried to go over some of the more recent reports of subjects that have been particularly interesting to me and it is quite obvious that it is impossible to cover everything that has been brought out in the literature.

The first thing that I have chosen to speak about is disruption of the abdominal wall, which is one of the ever-present worries of the general surgeon. It is of universal concern because it occurs in every general service in every hospital. It occurs unexpectedly and carries with it a very high mortality.

Grace[1] reports thirty-six cases with protrusions of the abdominal viscera and ten without protrusion of the viscera. It occurs at all ages from very young infants to the very aged. An analysis of these cases showed:

	Cases
Split right rectus, upper	28
Split left rectus, upper	8
Median epigastric	3
Split rectus, lower	3
Reversed Kammerer	2
Transverse	1
Median suprapubic	1
Total	46

Thirty-nine of the forty-six disruptions occurred in upper abdominal incisions. In their cases the majority of eviscerations occurred following operations for carcinoma, chronic ulcer, gallbladder disease and appendicitis. This suggests, at least, delayed healing in debilitated, run down individuals. Indirect causes listed by Grace were as follows:

	Cases
Infection	17
Coughing (pneumonia, 5 cases)	17
Vomiting	9
Distention or obstruction	4
Hiccoughing	4
Retching at lavage	2
Difficult sew-up	2
Patient getting out of bed	3
Not known	3

Infection, coughing, vomiting and distention were postoperative complications which occurred in forty-seven of their cases. Disruption may occur any time from the second to the fourteenth day or even later, but the majority of their series occurred between the fifth and tenth days.

Pink staining of the dressings accompanied by a watery discharge of peritoneal fluid may be one of the earliest symptoms, and as separation progresses, evisceration occurs. Secondary suture was employed in thirty cases and packing or strapping in sixteen. Where protrusion of the abdominal viscera occurred, the mortality was 41 per cent, but where evisceration did not occur, the mortality was 30 per cent.

William Crawford White[4] states that they have had no eviscerations in the intramuscular, Pfannenstiel or transverse incisions but disruption is essentially confined to midline, split rectus and the laterally retracted rectus incisions. In their series of eviscerations the mortality was 53 per cent. He believes there is a definite failure of healing in the aged, the decrepit, the malignant and the jaundiced due to inanition. He finds cough, distention and infection to be definite exciting causes but likewise believes that early absorption of catgut is an extremely important factor. Debilitated patients are being closed by through-and-through silk sutures put closely together and their disrupted wounds are being closed by the same method.

Isidor Kross,[3] in a review of 4,433 operations at Beth Israel Hospital, found occurrence of eviscerations to be just over 1 per cent. Sex and age were of no importance. He states that the theories generally advanced are: (1) failure of the suture material; (2) unusual strains; (3) constitutional factors and debility causing a failure of the wound healing processes; and (4) wound infection. He refers to the studies of wound healing made by Meleny and Howes, who divide the healing process into two stages: (1) the exudative, which lasts four or five days; and (2) the reparative stage, beginning at the end of the first stage and continuing until wound healing is complete.

In the first period an exudate develops which depends upon the number of injured cells, the amount of extravasated blood and lymph, bacteria in the wound and the amount of suture material employed. During this period the tensile strength of catgut sutures diminishes rapidly. As the exudate undergoes absorption, fibroplasia takes place with the formation of new scar tissue and a progressive increase in the strength of the wound. Tissue necrosis, hemorrhage, infection and debility delay the reparative processes. Freeman and King believe that an incomplete closure of the peritoneum permits a bulging of omentum or loop of intestine which, acting as a wedge, forces the tissues apart and eventually breaks through the skin. This factor is supported by the appearance of the edges of eviscerated wounds inasmuch as only the most recent part to separate is found to be bleeding. The other surfaces are gray, covered with exudate and do not present the appearance of being freshly torn apart.

Dr. Ralph Knight,[2] of our own Society, referred to reports by Sokolov, Willard Bartlett, Max Thorek and others, and reported four interesting cases of his own.

Practically all writers agree that catgut is not to be depended upon, that during the exudative period it rapidly decreases in strength and, in many individuals, absorbs before healing has taken place. The literature abounds in case reports in which, at the time of resuture of disrupted wounds, catgut with no tensile strength is found in the tissues.

William Hinton suggests allergy for an explanation of wound separation and incisional hernia. Decline in the strength of catgut after exposure to living tissue has been investigated by Rhoads. Implantation of several makes in the abdominal walls of dogs showed that the tannic iodized type presents substantially more resistance to tissue fluids than medium hard chromic catgut and is less acted upon by infection.

Fallis of the Henry Ford Hospital reports fifty disruptions to have occurred in 7,903 laparotomies. They perform immediate secondary closure with a mortality of 34 per cent.

From the foregoing it is obvious that wounds disrupt after closure with any type of suture. However, practically all essayists agree that catgut alone is not reliable. Even when tension sutures are used they may cut through the tissue and permit evisceration. However, if there is any lesson to be gained from the above it must be that in certain groups of cases where wound security is questionable one should exert every possible effort to prevent this dire complication.

A great deal of study has been going on in the last few years relative to the development of new and better sutures. C. J. Kraissl recommends some way of dispensing catgut other than the narrow glass tubes, which he believes kinks and weakens the strands. He also believes that during the absorption of the protein in catgut, the metals and halogens it contains are liberated and cause irritation which may interfere with wound healing. He believes this is particularly true of chromium, to which certain individuals may be sensitive. He states that it is possible to sensitize guinea pigs to catgut so as to produce disruptions in laparotomies sutured with this material. He also says, "The highest incidence of sensitivity was a group in which wound disruption had occurred and all allergic patients who had disrupted exhibited a sensitivity to one or more antigens." He suggests preoperative testing of

individuals by appropriate skin tests before using catgut for abdominal closure.

Shambaugh and Dunphy state that postoperative infection in contaminated wounds occurs less frequently when fine silk is employed. They believe that silk is much less irritating. They also used contaminated catgut and silk to close wounds in experimental animals. Their conclusions were that wounds thus infected healed better with silk than with catgut.

We have all experienced slowly healing sinuses in abdominal incisions which healed rapidly after the removal of a chromic knot. The essayist, twenty-five years ago, went through the stage of nonabsorbable suture, at which time it was necessary to use fine fish line in order to get silk with adequate tensile strength. Silver wire filigree was often used to reinforce incisional defects but in most instances these gross foreign bodies had to be removed.

Clifford Collins and J. Bellas, in a paper to be presented before the Western Surgical Association in December, state, "The ideal suture must be one that is non-reacting, one that is not affected by the enzymatic, chemical, physiologic, bacteriologic and physical influences such as occur in the body tissues and hence one that does not interfere with prompt, normal repair. Such an accomplishment is believed to have been attained in a new suture called platisgut on the basis of extensive animal and clinical experience."

Regarding carbon dioxide inhalation during closure of the abdomen, it would appear that there is still considerable controversy concerning its value. Thomas Ryan, Philadelphia, states, "It would appear that carbon dioxide is of no value in prevention of postoperative pneumonia." This is based on two series of patients in which 2.2 per cent of pulmonary complications developed following the use of carbon dioxide and 1.4 per cent complications in a similar group of cases where carbon dioxide gas was not used. These statements, however, are not conclusive and undoubtedly will not check with the findings of many others.

Roscoe Graham points out, "The surgeons' responsibility in the treatment of duodenal ulcer is to patients suffering from complicated ulcer, penetration, obstruction, recurrent hemorrhage or perforation." Treatment must result in the absence or decrease of free hydrochloric acid in the gastric contents. Gastroenterostomy should be reserved for scar stenosis and low free hydrochloric acid, and for elderly patients with penetrating nonobstructing ulcers but with low free hydrochloric acid in the gastric contents. All other patients should be treated with radical subtotal gastrectomy. In the treatment of acute perforation in duodenal ulcer, simple closure is all that is indicated.

Leon Goldman states that the mortality from bleeding ulcer is much higher than previously supposed. Repeated hemorrhage shows a rising mortality and surgery should be considered in view of intractable medical treatment.

Graham, Kalk, Strauss, Berg and others indicate a definite swing to the more radical gastrectomy. The Billroth I type of resection does not lend itself to the same successful results as the more radical Billroth II or the Polya type of resection.

Smith and d'Abreu of London recommend the anterior incision of the duodenum and suture of the posterior duodenal ulcer to control hemorrhage, while Hans Finsterer of Vienna is strong for the more radical type of operation. Finsterer states that when operation can be performed at the onset of hemorrhage or at least within twenty-four to forty-eight hours, satisfactory results can be expected with a very low mortality. On the other hand, the results of late operation for hemorrhage are bad, having had sixteen deaths in fifty-three resections. In forty-four resections following chronic hemorrhage, there were but two deaths.

While Berg and Strauss claim a larger percentage of marginal ulcers following gastro-enterostomy, the results claimed by the Mayo Clinic are much lower and gastro-enterostomy still has its definite indications.

Still states that of 105 patients on whom partial gastrectomy was performed for gastric ulcer, 103 were able to do hard work without restrictions of diet, and of 236 resections for duodenal ulcer, 223 were cured. Following 292 gastric resections there was only one gastrojejunal ulcer.

Lake reports 65 partial gastrectomies with immediate mortality of 6.3 per cent with 89.8 per cent satisfactory results. Berg, from the Mount Sinai Hospital, records 401 primary resections for gastric and duodenal ulcers with mortality of 6.9 per cent. Among 516 cases of primary and secondary gastrectomy he reports only six cases of possible recurrence, an incidence of 1.1 per cent.

Jennings reported a new and successful method of total gastrectomy in which the jejunum is sutured to the diaphragm and the ligated, cut-off end of the esophagus, which is free from the peritoneum, is introduced through the wall of the jejunum so that healing takes place between the jejunum and the diaphragm.

Dr. Wangensteen of our Society has proposed a similar new technic for total gastrectomy performed in two stages.

H. B. Sprung reports the end-results of 464 resections of the stomach for cancer. The mortality in the aged was 31 per cent while only 4 per cent in young subjects. The majority of deaths were caused by peritonitis or pulmonary complications. Three hundred twenty-five lived over one year, 233 over five years and 102 over fifteen years.

Gatewood has repeatedly called attention to the fact that the poor results from resection of gastric cancer is in part due to the pessimistic attitude of the doctor who is frequently to blame for the fact that the average patient does not report to the surgeon for operation for months following his first diagnosis of carcinoma.

I wish only to call attention to the work of Best and Hicken on the treatment of stones remaining in the common duct following surgery. Irrigation of the common duct through a T-tube with ether and alcohol, normal salt solution and oils, together with the use of antispasmodics such as atropin, glyceryl trinitrate, etc., will frequently empty the common duct of its re-

maining stones. A recent case of our own treated by this technic has responded readily with rapid emptying of the common duct as shown by visualization through the use of opaque media.

Fig. 1.

Fig. 2.

Fig. 1. Injection of the T-tube in the common duct with diodrast, six days post-operative. The ampulla is completely closed. The arrows mark negative shadows interpreted as small stones but which we believe to be air. Most of the injected solution follows out the sinus. The patient had gross symptoms of malaise, lack of appetite and general lack of well-being from the absence of bile, together with chalky stools.

Fig. 2. Through the T-tube the common duct was irrigated with ether, normal salt solution and oil, and the patient was given atropin, sedatives and glyceryl trinitrate for ten days. All drainage of bile around the tube stopped. Injection with diodrast showed the ampulla open and the dye passing directly into the duodenum. The T-tube was immediately removed without further biliary drainage after twenty-four hours.

The patient, aged forty-five, was operated upon for cholelithiasis. The gallbladder contained many small stones. The common duct was explored and found to contain numerous small stones and mud. A probe was passed through into the duodenum and the duct was thoroughly washed out with salt solution.

The operation which Lahey described before this Society for exteriorization of the right colon and anastomosis between the small bowel and transverse colon after the technic of Mikulicz is a great step forward and has greatly reduced the mortality and morbidity in handling carcinoma of the right colon. The double barrel colostomy of Lavine through which the distal colon may be irrigated and cleansed of infection will greatly reduce the mortality of resections of the distal colon, particularly for inflammatory disease such as diverticular tumor where the distal segment may be allowed to remain for a long time and to be almost completely sterilized. The similar operation as proposed by Lahey and Cotrell for sterilization of the rectum before the second stage resection has been extremely successful in our hands and I believe unquestionably will lower the mortality for radical resection for carcinoma of the rectum.

Rankin states that in the past three years he has found it advantageous in handling cancer of the rectum to adopt the following definite proposals.

1 He has abandoned intraperitoneal vaccination.

2 He has eliminated spinal as routine anesthesia.

3 He has extended preparation to at least seven days.

4 He has instituted routine presacral neurectomy.

5 He uses postoperative blood transfusions routinely.

6 He has adopted wider use of the single stage abdomino-perineal resection. Rankin concludes that there is no doubt but what there are cases in which it is advantageous to use the two-stage radical maneuver, and furthermore there are many cases in which it is unwise to employ either of these radical procedures in which operation may be undertaken by colostomy and posterior resection.

Gabriel of St. Mark's Hospital, London, reports an operative mortality of 7 per cent, which is almost identical with Rankin's 7.7 per cent. He also reports a 52 per cent five-year survival for all groups and all types combined.

With reference to Rankin's statement regarding presacral neurectomy we believe that this not too difficult procedure is a very definite step forward in the relief of chronic pelvic pain, especially that associated with certain types of malignancy. During the past year we had a patient complaining of almost intolerable pain in the pelvis following four pelvic laparotomies because of inflammatory disease of the tubes and cystic disease of the ovaries. In her last pelvic laparotomy performed by us, hysterectomy and presacral neurectomy were performed, following which the patient has had complete relief from pain.

Fallis reports 1,600 consecutive operations at the Henry Ford Hospital for hernia with a recurrence rate of 8.25 per cent, 7.4 per cent for indirect hernia and 11.6 per cent for direct hernia. They stress particularly in direct hernia, repair and reinforcement of Hesselbach's triangle. In the direct hernia it is important to repair the transversalis fascia. Bilateral operations show a definite increase in postoperative complications and in the recurrence rate. In the repair of direct hernias, large indirect hernias and recurrent hernias, together with large postoperative ventral hernias, the ordinary catgut closure is grossly inadequate and is followed by a large percentage of failure. In these patients we strongly advocate some more secure means of closure, such as the use of the McArthur strip in the inguinal hernia or the use of fascia lata after the technic of Gallie. With the more recent advances in sterilization and operating room technic and the vastly improved tensile strength of fine braided silk, we have personally experienced a very definite swing toward its substitution for catgut.

Dr. Culligan, a member of this Society, in a recent paper reported a 56 per cent reduction of recurrences in direct inguinal hernia by the use of some type of fascial suture. In most instances the McArthur technic was employed, paying particular attention to suture of the transversalis fascia.

We recently performed secondary cholecystectomy for recurrent empyema of the gallbladder with chronically infected sinus and postoperative incisional hernia. We were certain that, with extensive suppuration, catgut could not be relied upon and adopted the procedure of Babcock and others, of closing the abdominal wall with steel wire. Suppuration was marked as anticipated, the wound held securely and the wire has

become firmly incorporated as evidenced by x-ray examination.

There has been a definite return of the Ochsner method in the treatment of late cases of appendicitis. I believe that this is a step forward and is due to the excellent teachings of Dr. Wangensteen as fostered at the University Hospital.

Intestinal decompression by continuous suction has become extremely popular. The modified Miller Abbott tube, which consists of two small tubes lying side by side through one of which a small balloon may be distended, aids the passage of the tube through the small intestine and intubates a much lower level. Many patients may be tided over without surgery and those with definite mechanical obstruction are often improved to the point that surgery is rendered much more safe.

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Discussion

DR. ARTHUR F. BRATRUD: Dr. Maxeiner has covered so many phases of this subject so completely that it is practically impossible to add anything. However, there are a few things that might be mentioned, in regard to some of the newer advances in surgery. Dr. Maxeiner spoke about the plastic repair in hernias. In looking over the literature, you may have read a few articles where "cold water" is being thrown upon the plastic repair of hernias, that the recurrence rate is higher where plastic repair is performed than where it is not performed. I am going to read just a short statement that was made in 1890 by Halstead in referring to Dr. Bull and speaking of hernias at that time. Hernia surgery really began about 1880, and in 1890 here is the statement he made: "That ten years have elapsed since the modern radical operation for inguinal hernia has been in vogue, we ought to have presented to us patients who have been more than five years at the least without relapse. We could naturally expect to see such cases occasionally, but there are none such."

I think that may be the attitude a good many men are taking toward the newer advances in surgery, and especially toward plastic repair in hernias. I have had some interesting experience as far as fascial proliferation is concerned. Quite a number of years ago, in suppurative abdominal cases, I began closing these patients with just strips of adhesive tape. The peritoneum was sutured, but nothing else was sutured, and it is interesting to note what happened. Most of those patients healed by primary union in about two weeks. There was no suppuration in the wound or fascia with very little separation of fascia. Occasionally a patient would develop a hernia and I thought that by taking a forceps and clamping across the edge of the cut fascia so as to hold the edges together, without any suture but by leaving the clamps on for two days, that hernia could be prevented. What happened was this: Those wounds all became infected, due undoubtedly to the trauma produced by the clamping of the forceps across the fascia, and the fascia sloughed. With the patients who did not have the clamp put on, a very interesting fact was observed when they came to operation if a hernia had resulted. Instead of the fascia coming out to a point in a "v" shaped manner, being very thin at the margin, it was thick and round, a good deal like the shape of a pear, so that the closure of those hernias was very easy. All that was necessary to repair the hernia was to split the fascia, because there was so much proliferation and thickening of the fascia.

I think that brings up the very interesting observation as far as the plastic repair of hernia is concerned. Usually when we take the fascial strips, a clamp is fastened across the fascia before the stripper is put on. This does definitely traumatize the fascia and traumatized fascia is more liable to become infected. I think that we all make a mistake when we do not cut off that traumatized area before we attach the silk suture and attach the fascia in the wound, in plastic repair of hernia, because it undoubtedly is a predisposing factor toward inducing infection in that wound. Infection is one of the complaints of most of the men who have been doing fascial transplants. The high incidence of infection in these plastic repairs of hernia is undoubtedly the cause of the high recurrence that is being reported. Fascia properly handled and used in a transplant does remain viable and does not atrophy and absorb, as stated by some surgeons. While doing peripheral nerve surgery in the Army I had the opportunity to operate in cases where fat fascia transplants had been placed around the nerve suture line, as many as three years previously, and the fascia had not absorbed.

I have always been rather in favor of silk suture of wounds. I have made the statement at the hospital a number of times to the internes, that I would like to see ten patients in whom catgut is used and ten in whom silk is used. I could then send any interne down through a ward and he would be able to pick out the ten patients in whom silk had been used and the ten in whom catgut had been used. You can do that very easily because there is an induration and thickening in the tissues following the use of catgut, whereas with silk there is a very nice soft wound. Anybody can pick out the cases that have been operated upon with fine silk. That simply confirms the observation made by some men connected with the Chicago University in regard to wound healing, and also recently emphasized by Whipple (I believe one of the last articles was in Annals of Surgery), that you get more exudate in wounds where plain catgut is used than where you use chromic catgut. Chromic catgut produces more exudate in wounds than silk does. In other words, there is apparently some allergic factor in or irritation from the catgut that produces excessive exudate, and Whipple also goes on to show where you have used catgut you have a certain amount of necrosis around the suture line, around the catgut, with either plain catgut or chromic.

I think Dr. Maxeiner brought out a very interesting thing in the case cited in regard to presacral neurectomy, which is a wonderful thing. You may remember a number of years ago where, when we had severe cases of dysmenorrhea, we used to do the ordinary Pozzi operation. Occasionally we would get a result, but in most cases we would not. There probably were as many good results with the ordinary dilatation and curettage, as resulted with the Pozzi operation. I believe the case that Dr. Maxeiner illustrated is a wonderful thing, because it brings out the importance of presacral neurectomy in some of these cases of intractable pain in the pelvis. I understand now that with some of these tuberculous bladders, irritable bladders, etc., they are getting wonderful results with presacral neurectomies.

PRESENT STATUS AND MODERN ADVANCES IN THE SURGERY OF THE KIDNEY AND BLADDER

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Perhaps I ought to begin by apologizing because about two-thirds of my remarks have to do with the medical rather than with the surgical aspect of urology, since many recent advances have been of a medical nature.

The first development which deserves comment is a diagnostic procedure which has been one of the most useful contributions to medicine in many years, namely excretory or intravenous urography, which was introduced by Swick and Von Lichtenberg in 1929. In its present form it will give adequate and satisfactory information about the form and function of the kidneys in somewhere between 70 and 80 per cent of the cases. If it does nothing more than reduce the necessity for cystoscopic examination by a large percentage it is well worth while from the humanitarian point of view alone. It has reduced the number of cystoscopic examinations and retrograde pyelograms to the extent that in the average case it is necessary to resort to cystoscopy in the study of lesions of the kidney only to settle certain details.

Failures are due either to impairment of renal function or (and this is more often the case in ordinary circumstances) to technical blunders in connection with the timing of the films and with their proper exposure.

Any discussion of therapeutic advances reminds us that this is an age of great enthusiasm for the hormones, and urology has been affected as much as any other specialty. I think that much of this enthusiasm will subside in time, but that remains to be seen. The anterior pituitary and the anterior pituitary-like hormones are now widely used in impotence and in aspermia on the assumption that they stimulate the interstitial cells of the testes to produce testosterone, and the germinal epithelium to produce sperm. There is very definite experimental evidence showing that they do stimulate the elaboration of testosterone, but whether they produce spermatogenesis is open to doubt.

As you know, the anterior pituitary-like hormone has also been widely used to induce descent of the undescended testicle. The preparation was first used clinically by Shapiro in 1930 and has since been rather generally adopted.

Thompson and Heckel among others have made the interesting observation that it is possible, with sufficient dosage over a sufficiently long period of time, to induce hypertrophy of the male external genitalia, including the penis. They have suggested its use in children with hypospadias to increase the size of the penis in order to facilitate operation. Personally I see no objection to waiting until nature produces the enlargement, as she almost invariably will, since the results of operation are as good in the adult as in the child. Apparently there are no ill effects, since the changes produced, with the exception of descent of the testes, disappear shortly after the administration of the drug is discontinued. The exact value of anterior pituitary-like hormone in failure of descent of the testes is pretty hard to estimate because reports of success in the literature range from 25 to 90 per cent. Those reporting lower percentages are inclined to suspect that the very good reports result from the confusion of physiological ectopy with true failure of descent. In the former, spasm of the cremaster muscle holds the testis in the region of the external ring and there is actually no congenital anomaly requiring correction.

Second in present popularity are the testicular hormones. These are divided at the present time into two main groups, the fat-soluble hormones said to come from the interstitial cells and called generally testosterone (andosterone if it is recovered from the urine). It is recommended in hypogonadism in which the testes are very badly damaged or absent. If testes are present and apparently normal or small, anterior pituitary-like hormone is recommended in order to stimulate these testes, whereas if there appears to be no possibility of stimulating the growth and spermatogenesis of the testes, testosterone appears to be preferable. Its successful use in eunuchs has recently been reported both in the medical and in the lay press by Vest and others in Baltimore.

The fat-soluble testicular hormone testosterone is also recommended in prostatic hypertrophy. Its use here is based upon the assumption that in the normal male both estrogenic and androgenic hormones are present, and that with advancing years there is a diminution in the production of male hormone with a relative but not an absolute increase in the estrogens. This idea has originated from the fact that experimentally one can produce a type of prostatic hypertrophy quite unlike that seen clinically, by the administration of estrogens. It is thought to counterbalance this relative excess of estrogen by the administration of the fat-soluble hormone.

We have had a fairly considerable experience with testosterone in prostatism at the University Hospital, and it is my opinion, after treating some thirty or thirty-five cases, that it is probably a form of psychotherapy, but that needs to be verified.

There is a second hypothetical testicular hormone which also has been recommended for prostatic hypertrophy by Lower and his group. It is said to be the water-soluble hormone of the germinal epithelium and is called by him inhibin. Its function is said to be to hold the anterior pituitary in check and to prevent hypersecretion, since it has been shown experimentally that the administration of anterior pituitary or anterior pituitary-like substances to the experimental animal may induce prostatic hypertrophy. He has undertaken to administer this hypotheical hormone by feeding patients dried testicular substance, and has maintained that some 45 per cent of those treated have been very distinctly benefited. By none of these hormones is it possible to reduce the residual urine or to change

the size of the prostate, *i.e.*, the improvement is functional.

And now something about urinary antiseptics. I suppose the modern era of urinary antisepsis can be said to have started with the administration of the ketogenic diet for sterilization of infected urine. Its use was based upon the observation at the Mayo Clinic that an unsterile bottle of urine from an epileptic patient who had been kept on a ketogenic diet had been mislaid in one of the examining rooms and had kept fresh and free from odor for four or five days. Since it had not been collected with sterile precautions it was evident that there was something very unusual about this urine. Investigation showed that it contained ketone bodies. This was immediately and successfully employed in infections of the urinary tract by Clark, Helmholtz and others. Fuller subsequently showed that success was due to the presence in the urine of betahydroxy butyric acid, which, for optimum results, should reach a concentration between 0.5 and 1 per cent at a pH of 5.5 or below.

This method of urinary antisepsis is most effective against Gram-negative bacilli. It is an exteremely unpleasant business for the patient. It is difficult to take, and the diet must be controlled absolutely or no ketosis is produced. For that reason, everyone was pleased when Rosenheim, in a search for a stable but effective substitute for betahydroxy butyric acid, found that mandelic acid was not changed in the body, was excreted in the urine, and had about the same antiseptic properties under the same conditions as had the ketogenic diet. It was distinctly less difficult to take. Mandelic acid must also reach a concentration in the urine of between 0.5 and 1 per cent at a pH of 5.5 or below, and it has its best effect in infections with Gram-negative rods and the Streptococcus fecalis.

One or two of you may have heard of the third modern urinary antiseptic which is known as sulphanilimide, and may know something about its history. It was apparently first applied to infections in the urinary tract by Colebrook and Kenney in England, and since has been very widely used in this country. It was apparently first used for gonorrhea by Dees and Colston in Baltimore, and has since been employed by practically every physician in the United States and probably also in Europe. It appears to be effective under favorable conditions in infection of the urinary tract by almost any type of organism except the Streptococcus fecalis. One of the strong points in its favor is that it will sometimes actually sterilize the urine in the presence of Bacillus proteus, something which has hitherto been impossible of accomplishment by any other means. No one, of course, can estimate its exact place in therapy but I don't think anyone can deny that two of the outstanding advances in combating infections in the urinary tract and the genital tract as well, have been the introduction of mandelic acid and of sulphanilimide.

A word about urinary lithiasis. Higgins has applied the previous experimental work of others on rats to the human, and has concluded that, in the human as well as in the rat, urinary stones result from deficiency of vitamin A, which, among other things, produces an alkaline urine and encourages the development of infection. He has undertaken to treat and says that he has been able to dissolve a number of stones in the kidneys by the administration of a high vitamin acid ash diet. Apparently he doesn't believe in taking chances because he doesn't confine himself to the administration of vitamin A but includes B, C, D and a few others for good measure and keeps the pH of the urine below 5.5. He alone, so far as I know, has been able to cause the dissolution of renal stones by this method, which is probably of value chiefly in preventing the recurrence of stones after operation rather than in dissolving stones already formed.

Another thing that may be an advance in connection with lithiasis is an increasing appreciation of the rôle of bacteria, not so much in the production of primary stones as in the production of recurrences following operation. Chief offenders are the urea splitters, of which Bacillus proteus is the worst; staphylococci and other organisms may split urea, produce alkaline urine, and lead to stone formation.

And now a word or two about surgery, since this is a surgical society. One can dismiss the subject of the kidney by saying that recent times have witnessed wider application of conservative operations. The operations themselves, particularly the plastic procedures upon the ureteropelvic junction for hydronephrosis, are not new. Present practice tends to the more frequent removal of stones from the kidney rather than to the removal of the kidney whenever it seems at all likely that the kidney can be saved.

I suppose that division of the isthmus of the horseshoe kidney ought to be mentioned as a recent advance. Although the operation was first done by Rovsing many years ago, it has only recently come into use in this country.

In the surgery of the prostate the outstanding advance has of course been the widespread use and improvement of the operation of transurethral resection, whether by the so-called cold punch or by the diathermy loop. While no one has yet been able to decide just how widely the operation ought to be applied, I think that depends largely upon the ability and the inclination of the individual surgeons. Certainly there is no question but that some 98 per cent of all prostatic obstructions *can* be relieved by transurethral resection. Whether it *should* be applied to 98 per cent is another question. That will depend, of course, upon the late results. As now done by experienced operators, transurethral resection is very nearly as complete an operation as prostatectomy and is applicable to all except the very largest glands and in those cases in which urethral stricture prevents the introduction of the instrument. It is of very distinct value in carcinoma of the prostate which is inoperable so far as cure is concerned, in that it restores to the patient the ability to urinate normally without the assistance of apparatus. It has the advantage over prostatectomy, whether suprapubic or perineal, of a lower mortality, a shorter hospital stay,

and of greater comfort for the patient. It has the disadvantage that it is difficult to secure an opportunity to learn how to do the operation because it is a tricky business and is something like golf in that, if you want to do it well, you must do it frequently.

Surgery of the bladder has been marked by a swing to the use of transurethral methods doubtless under the influence of the results of transurethral resection of the prostate. There has been a distinct increase in the application of litholapaxy, which, until recent years, had fallen into almost complete disuse. There has also been an increasing tendency to apply transurethral methods to the treatment of tumors of the bladder. These methods consist in cystoscopic excision with the diathermy loop, fulguration, and the implantation of radon. They have been supplemented by the more effective use of high voltage x-ray therapy based upon the ideas of Coutard (small, frequent, long continued dosage) so that the total amount of irradiation delivered to the objective is much higher than it was with the older methods of larger doses at less frequent intervals.

One other thing that deserves mention is presacral neurectomy for neurogenic vesical dysfunction with retention of urine. While I have undertaken a very painstaking study of its value, I find myself as uncertain after six operations as I was in the beginning. It has also been recommended in interstitial cystitis, a condition in which, as you know, the submucosa is replaced by scar tissue and the bladder is contracted, irritable and painful. Of the two patients upon whom I have done the operation, one is perfectly certain that she has had very definite benefit although she still comes back every three to six months for over-distention of the bladder, a fact which makes me rather skeptical as to its actual value. There has been no increase in the capacity of the bladder but the amount of pain associated with urination has been very definitely diminished. In the other case there was no apparent change. I have used it once in intractable encrusted cystitis with lasting benefit but not cure.

Discussion

DR. T. H. SWEETSER: I wish to call attention to two matters only: first, I wish to mention two aids in the passage of ureteral calculi. The first of these is the taking of 200 grams of glycerine diluted to a liter with water, and imbibed while in a hot tub bath. It was recommended in 1933 by H. Gissel at Rostock. I have tried it a number of times with varying success. The other aid was described by Jarman and Scott of Rochester, N. Y., in 1937—the injection of a 4 per cent solution of avertin crystals into the renal pelvis and ureter above the calculus. Their method is to insert three or four catheters and bougies and leave them 48 hours before injecting avertin before and during removal of the catheters. I have modified the procedure as follows with success: a ureteral catheter was passed to the renal pelvis beyond the calculus and avertin injected as advised by Jarman and Scott; after fifteen minutes a Johnson stone basket with filiform tip was passed, using the catheter as a guide; the catheter was then removed, the basket was removed, bringing the stone with it. I feel that this modification of the procedure is worthy of further trial.

The second matter of special present interest to me is the use of air cystograms in the study of vesical neck obstructions, especially in the study of difficulties following prostatic surgery. I wish to show some illustrative air cystograms now. I feel that this simple procedure, when considered with the rectal palpation and test of residual urine, gives a surprisingly accurate and graphic demonstration of the conditions present.

DR. E. L. MELAND: I have enjoyed very much listening to Dr. Creevy's presentation in newer developments in urology and, inasmuch as he has covered the field so well, there is not much to add. There are two subjects which he did not touch upon which I would like to mention.

The first is radical perineal prostatectomy for early carcinoma of the prostate. This is an operation which was proposed by Dr. Young as long ago as 1904, so the procedure is not new. However, marked interest has been shown in this subject in the last few years. The operation is only applicable to those cases in which there is a small nodule well contained within the capsule without any evidence of extension outside. Obviously, the number of cases to which the operation can be applied is very small. The opportunities for applying this procedure are dependent upon the early recognition of nodules which may be malignant. An attempt should be made to educate the medical profession in general to the possibilities of radical perineal prostatectomy.

The second subject is on the treatment of a certain small number of cases of prostatitis. A few years ago Dr. Thompson described a new method of dealing with dilated ducts in the prostatic urethra which were, virtually, the internal openings of small sub urethral abscesses. Where this condition exists the proper treatment will, in many instances, lead to a marked improvement in the existing infection in the prostate and, occasionally, practically the eradication of the infection. Those patients in which there are many local symptoms such as burning and frequency are usually relieved of these symptoms by slitting of the dilated ducts and excision of the overhanging edges. It is possible with this operative procedure to evacuate prostatic calculi when they are present.